338

L. F
DENVER, COLORADO

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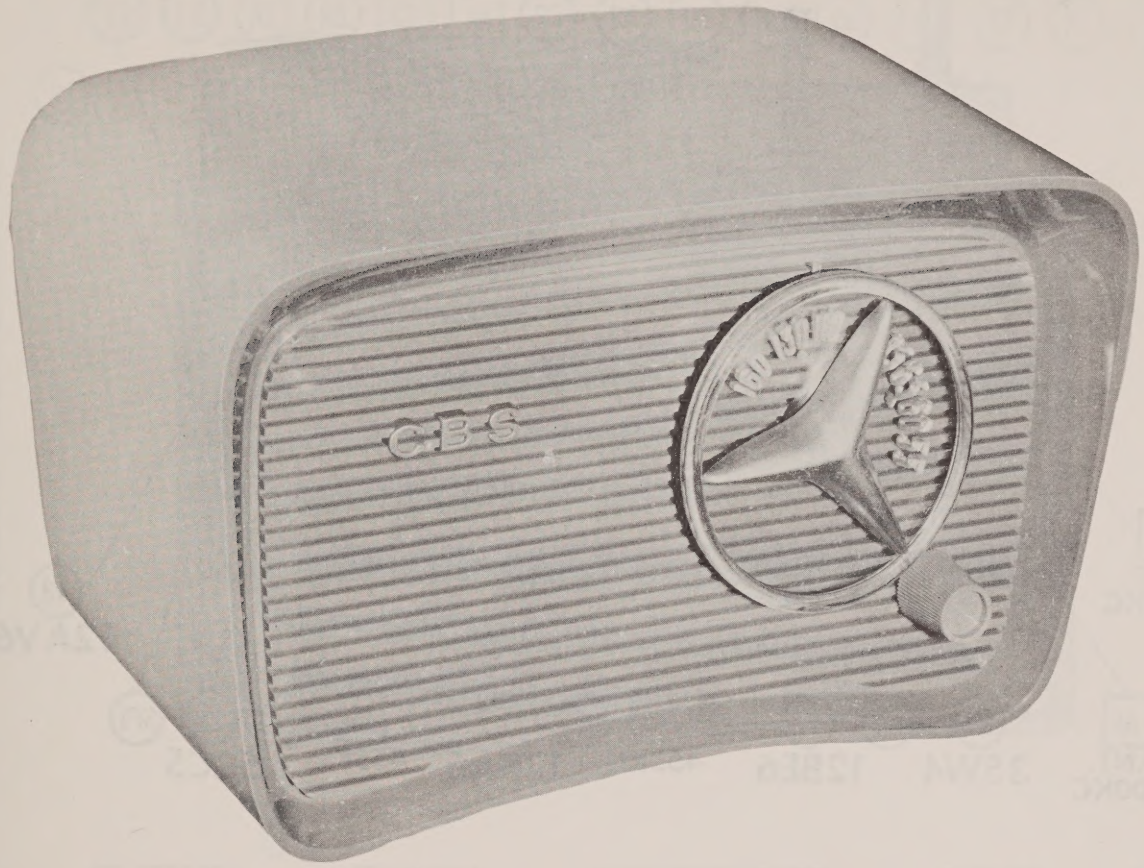
CBS-COLUMBIA MODELS T200, T201, T202, T203, T204 (Ch. 216)

CBS-COLUMBIA MODELS T200, T201, T202, T203, T204 (Ch. 216)



CBS-COLUMBIA MODELS T200, T201, T202, T203, T204 (Ch. 216)

TRADE NAME	CBS-Columbia Models T200, T201, T202, T203, T204 (Ch. 216)
MANUFACTURER	CBS-Columbia, Div. of Columbia Broadcasting System, Inc., 48-50 34th. St., Long Island City, N.Y.
TYPE SET	AC-DC Operated AM Superheterodyne Receiver
TUBES (Five)	Types 12BE6 Converter, 12BA6 IF Amplifier 12AV6 Det.-AVC-AF Amp., 50C5 Output, 35W4 Rectifier
POWER SUPPLY	105-120 Volts AC-DC RATING .27 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	535KC-1620KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use insulated alignment screwdriver for adjusting.
Loop should be maintained in same relative position to chassis as when receiver is in cabinet.
Use isolation transformer, if available. If not, connect a .1MFD capacitor in series with low side of signal generator and B-.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.05MFD	High side to pin 7 (grid) of 12BE6 (V1). Low side to chassis.	455KC (400%Mod)	Tuning gang fully open	Across voice coil	A1, A2, A3, A4	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001MFD to reduce hum modulation.
2.	"	"	1620KC	"	"	A5	"
3.		Loop	1400KC	Tune to 1400KC signal	"	A6	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.

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PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Converter	12BE6	
V2	IF Amplifier	12BA6	
V3	Det.-AVC-AF Amplifier	12AV6	

ITEM No.	USE	TYPE	NOTES
V4	Output	50C5	
V5	Rectifier	35W4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	CBS-Columbia PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	70	150	21001181	PRS150V4080	BBRD8415	TCD498	TDLD-11	FMT-1540	TVA-3451
B	40	150							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	CBS-Columbia PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C2	.047	400	22011740	BPD-05	DF-503	CUB4S47		PT4147	4TM-S47	
C3	10000		23064520	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C4A	220		†82000151	†PA-113-3	†PC-154				†DT-3	
B	2000									
C	5000									
D	500									
E										
C5	.022	400	22011700	BPD-02	DF-203	CUB4S22	817-02	PT4122	4TM-S22	
C6	.047	400	22011740	BPD-05	DF-503	CUB4S47		PT4147	4TM-S47	
C7	.1	400	22026280	P488N-1	DF-104	CUB4P1		PT401	4TM-P1	

† Items C4A, C4B, C4C, C4D, C4E, R6A, R6B and R6C are combined in one unit. When replacing items separately, C4D and C4E should total 500MMF.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	CBS-Columbia PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	500K	½	36001651	AB-60	A47-500K-Z	Q13-133	U48	Volume
B	Shaft		Not Req.	AK-4	KSS-3	Not Req.	Not Req.	Attach to R1A
C	Switch		Not Req.	AK-1	SWE-12	76-1	US-26	Attach to R1A

RESISTORS

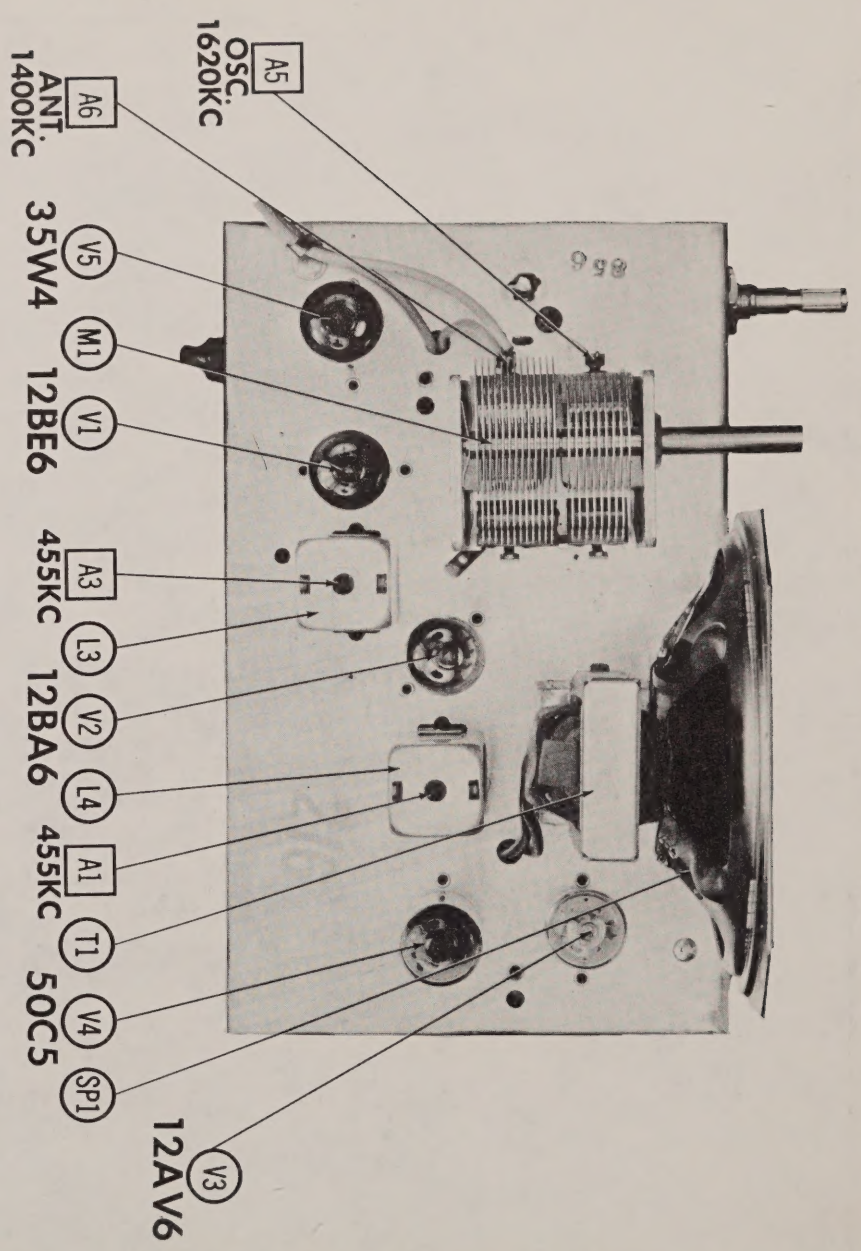
All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	CBS-Columbia PART No.	IRC PART No.	
R2	22K		30223230	BTS-22K	
R3	220K		30224330	BTS-220K	
R4	120Ω		30121230	BTS-120	
R5	3.3Meg		30335330	BTS-3.3Meg	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	CBS-Columbia PART No.	IRC PART No.	
R6A	6.8Meg		†82000151	BTS-6.8Meg	
B	470K			BTS-470K	
C	470K			BTS-470K	
R7	150Ω		30151230	BTS-150	
R8	1500Ω	1	30152240	BTA-1500	

† Items R6A, R6B, R6C, C4A, C4B, C4C, C4D, C4E are combined in one unit.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	CBS-Columbia PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	2200Ω	3-4Ω	Part of Spkr. 73001161	Z1101 ①	A-3025①	A-3332 ①	26S58①	S-12X ①	① Bend ears down to fit.

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	CBS-Columbia PART No.	QUAM PART No.	RCA TYPE No.	
SP1	4"	PM	3-4Ω	73001161	4A07	223S1	

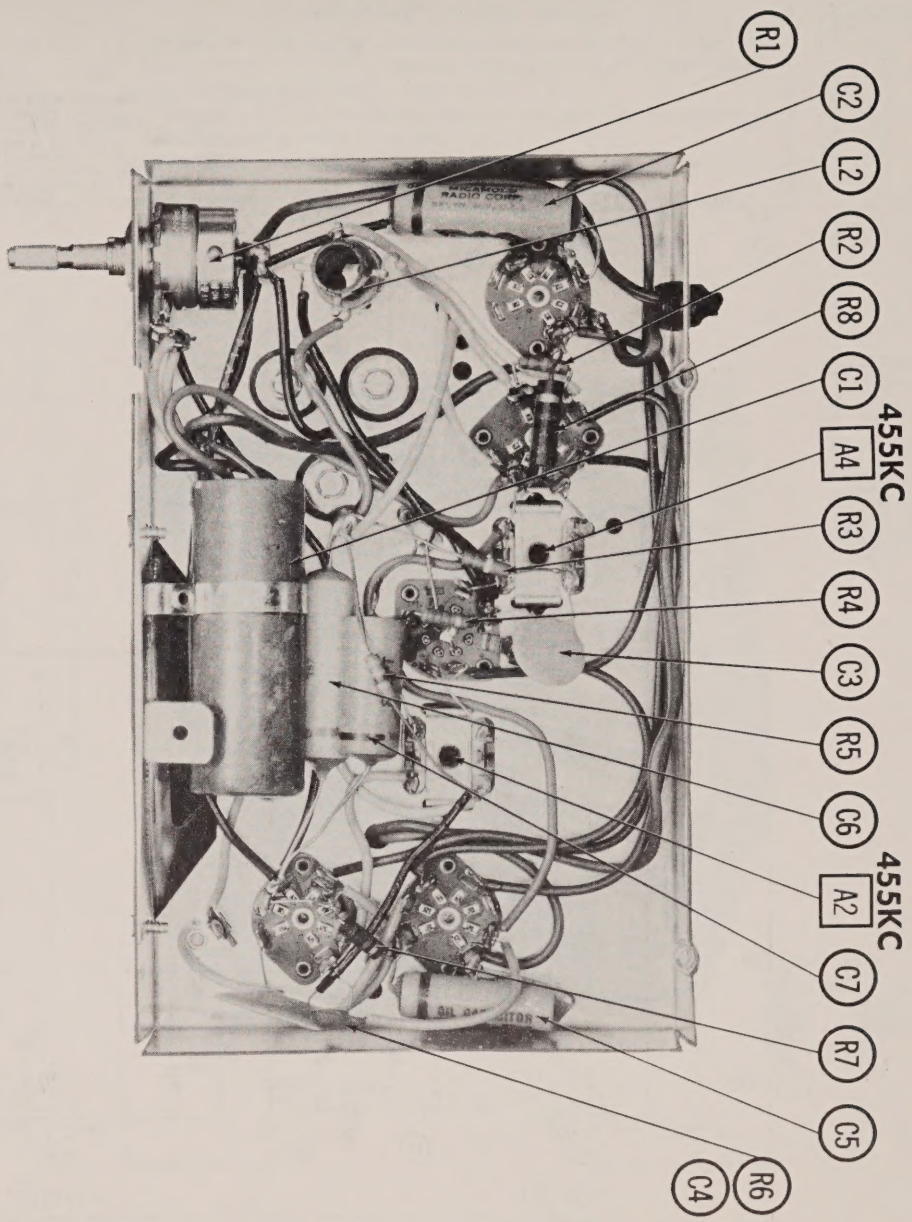
COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	CBS-Columbia PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Loop Ant.	3.3Ω		79000331				Includes cabinet back
L2	Osc. Coil	.9Ω	12.5Ω	15000781			69-OSC *	* Drill mounting hole
L3	Input IF	18Ω	18Ω	12000281	16-6758	BC-352	12-C1	
L4	Output IF	18Ω	18Ω	12000281	16-6758	BC-353	12-C2	

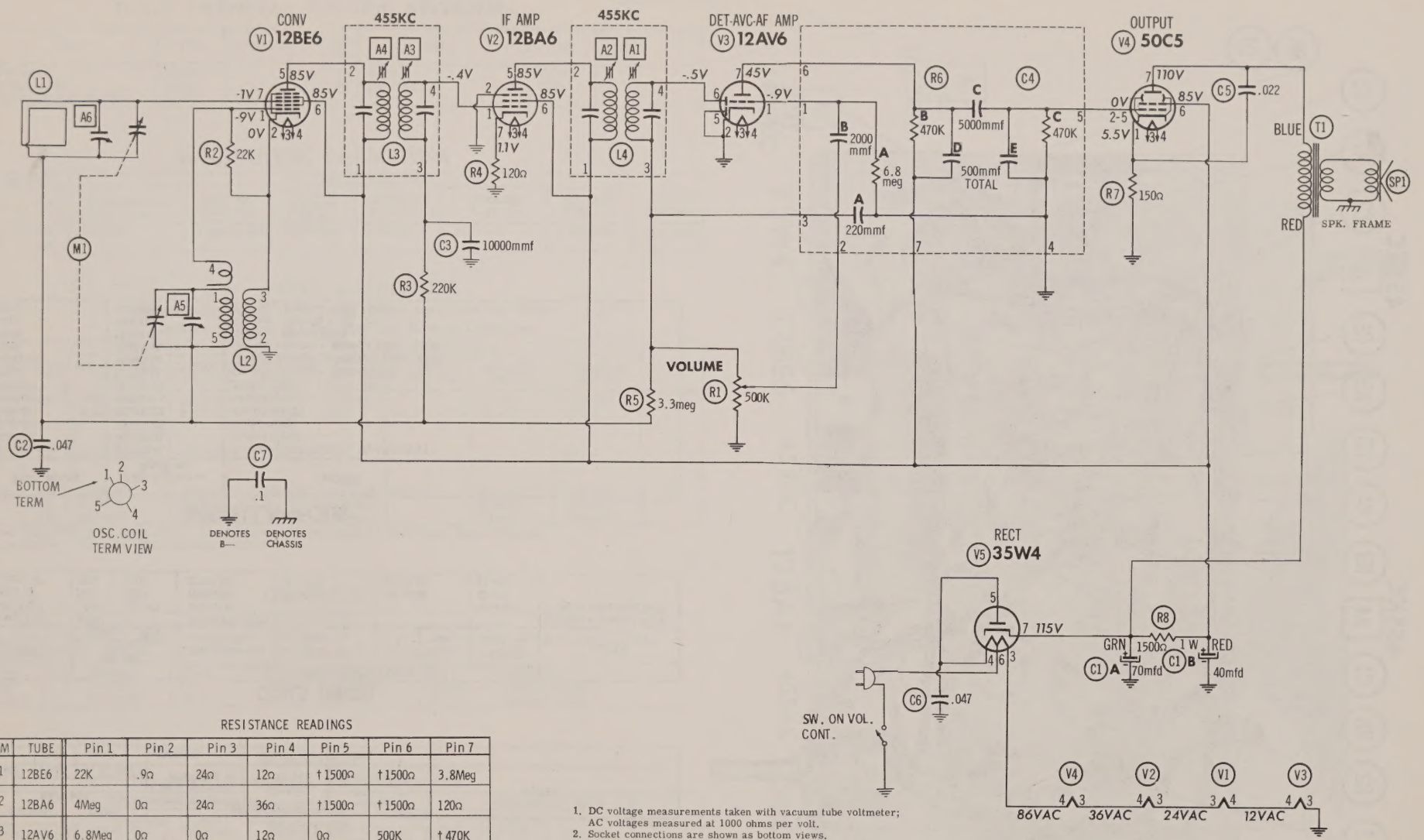
MISCELLANEOUS

ITEM No.	PART NAME	CBS-Columbia PART No.	NOTES
M1	Tuning Cap.	24000241	2 Gang (20-380MMF, 20-120MMF)
	Cabinet	70002721	Model T200
	Cabinet	70002722	Model T201
	Cabinet	70002723	Model T202
	Cabinet	70002724	Model T203
	Cabinet	70002725	Model T204
	Knob	76004141	On-off-volume - Model T200
	Knob	76004142	On-off-volume - Models T201, T202
	Knob	76004143	On-off-volume - Models T203, T204
	Knob	76004151	Tuning, Model T200
	Knob	76004152	Tuning, Models T201, T202
	Knob	76004153	Tuning, Models T203, T204

CHASSIS—BOTTOM VIEW



CBS-COLUMBIA
MODEL T200 (Ch. 216)



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V1	12BE6	22K	.9Ω	24Ω	12Ω	†1500Ω	†1500Ω	3.8Meg
V2	12BA6	4Meg	0Ω	24Ω	36Ω	†1500Ω	†1500Ω	120Ω
V3	12AV6	6.8Meg	0Ω	0Ω	12Ω	0Ω	500K	†470K
V4	50C5	150Ω	470K	36Ω	86Ω	NC	†1500Ω	†210Ω
V5	35W4	NC	NC	86Ω	125Ω	125Ω	120Ω	30K

† MEASURED FROM PIN 7 OF V5.
NC NO CONNECTION.

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

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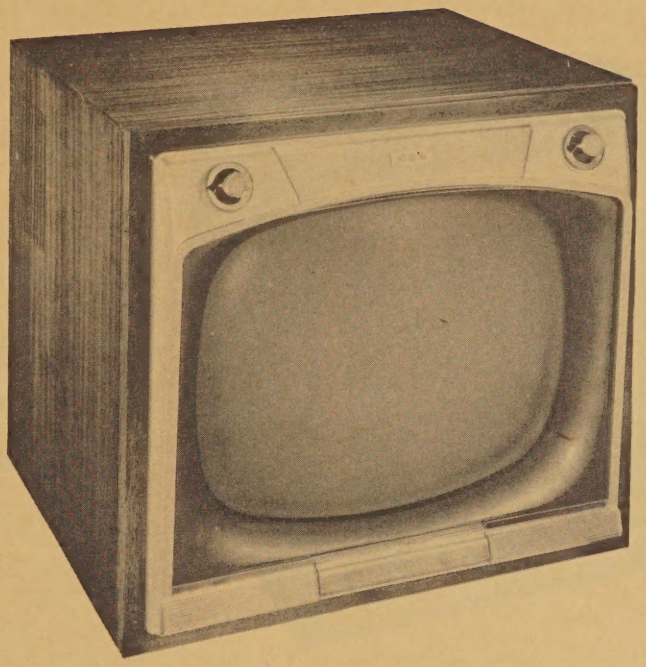

CBS-COLUMBIA MODEL 7T309 (Ch. 3001)

TRADE NAME	CBS-Columbia	MODELS	CHASSIS
		7K325, 7K326, 7T307, 7T309, 7T310	3001
		7K325U, 7K326U, 7K329U, 7K330U, 7K332U, 7T307U, 7T309U, 7T310U	3002
		7KR329, 7KR330, 7KR332, 7TR311, 7TR312	3003
		7K333U, 7K334U	3012
		7KR333, 7KR334	3013
		7KR335, 7KR336	3015
MANUFACTURER	CBS-Columbia, A Division of Columbia Broadcasting System, Inc., 48-50 34th. St., Long Island City, N.Y.		
TYPE SET	Television Receiver		
TUBES	Twenty-three		
POWER SUPPLY	110-120 Volts AC-60 Cycle RATING 1.9 Amp. @ 117 Volts AC		
TUNING RANGE	Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)		

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CBS-COLUMBIA MODELS 7K325, U, 7K326, U, 7K329U, 7K330U, 7K332U, 7K333U, 7K334U, 7KR329, 7KR330, 7KR332, 7KR333, 7KR334, 7KR335, 7KR336, 7T307, U, 7T309, U, 7T310, U, 7TR311, 7TR312 (Ch. 3001, 3002, 3003, 3012, 3013, 3015)

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DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

1. Remove 7 push-on type control knobs from front panel of cabinet.

2. Remove on/off volume control knob . Remove control nut and remove volume control.

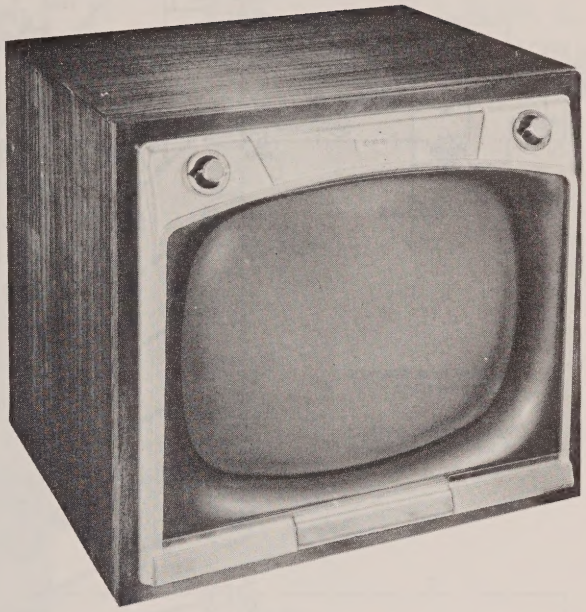
3. Remove 7 wood screws and 1 metal screw. Remove rear cover.

4. Remove tuner extension shaft by loosening set screw from coupling.

5. Disconnect speaker plug, pilot light leads and ground leads.

6. Remove 4 chassis bolts. Remove chassis.

7. Remove 2 speaker nuts. Remove speaker.



MODEL	CHASSIS
7T309	3001

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustments of the VHF tuner oscillator circuit may be accomplished by adjusting oscillator slug thru hole in cabinet marked "Oscillator Tuning". Insert adjustment tool in hole at approximately 20 degree angle.

PICTURE TUBE SAFETY GLASS CLEANING

Remove cover on each side of control panel at the bottom edge of the safety glass. Remove 2 wood now exposed and remove plate and safety glass. Use extreme caution when removing safety glass.

SERVICE ADJUSTMENT LOCATION

See tube placement chart on page 5.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

The horizontal oscillator may be adjusted from the rear panel of the chassis. Set the horizontal hold control at the center of its range and adjust the horizontal AFC coil (L20) until the picture synchronizes horizontally.

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate sound IF detector buzz, adjust the ratio detector secondary (L18) located on top of the chassis.

FUSES

One fuse is used for horizontal sweep circuit protection. (For location see tube placement chart).

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube, located flush against the deflection yoke. Rotate the two rings around the neck of the tube until the picture is properly centered.

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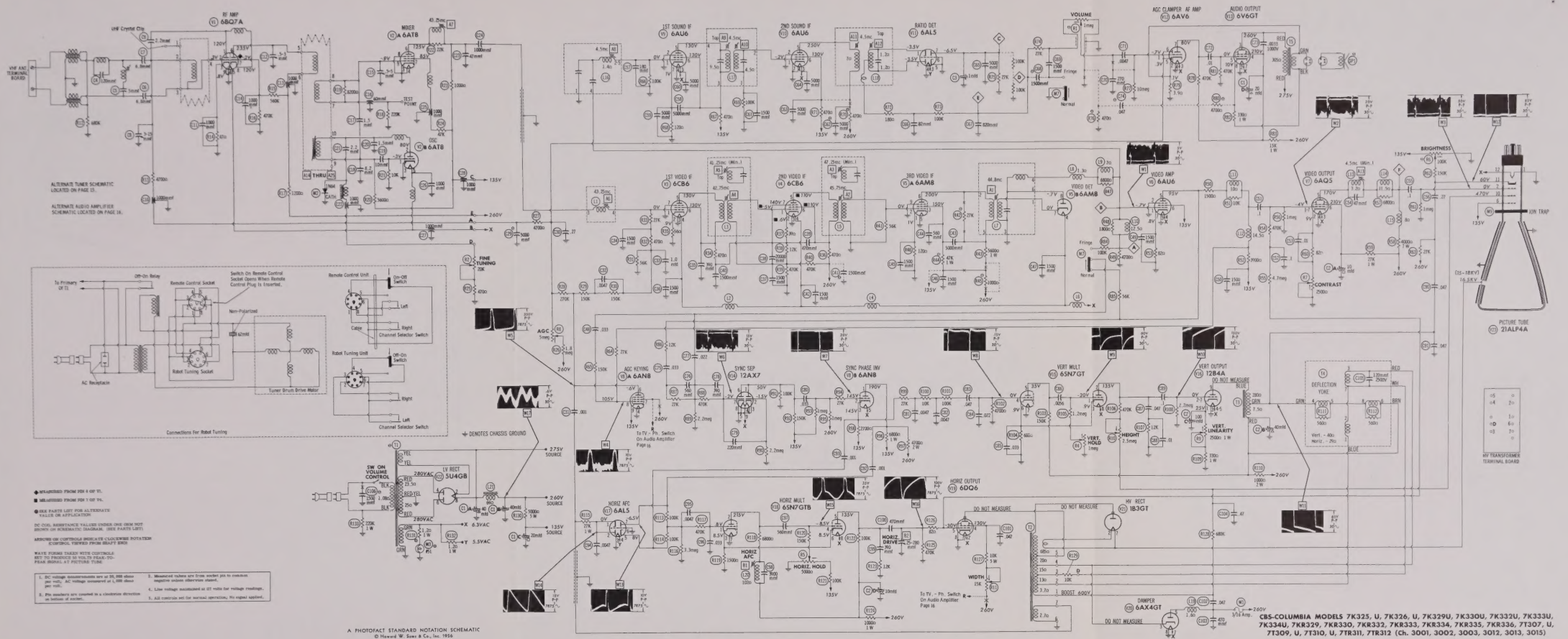
RF AMP V1 6BQ7A
MIXER V2A 6AT8
OSC V2C 6AT8
1ST SOUND IF V3 6AU6
2ND SOUND IF V4 6AU6
RATIO DET V11 6AL5
VOLUME
AGC CLAMP AF AMP V12 6AV6
AUDIO OUTPUT V13 6V6GT
1ST VIDEO IF V5 6CB6
2ND VIDEO IF V6 6CB6
3RD VIDEO IF V7 6AM8
VIDEO DET V8 6AM8
VIDEO AMP V9 6AU6
VIDEO OUTPUT V14 6AQ5
BRIGHTNESS
CONTRAST
ION TRAP
PICTURE TUBE V21 21ALP4A
AGC KEYING V6 6AN8
SYNC SEP. V14 12AX7
SYNC PHASE INV V10 6AN8
VERT MULT V15 6SN7GT
VERT OUTPUT V16 1284A
HEIGHT
VERT. HOLD
VERT. LINEARITY
DEFLECTION YOKE
HORIZ AFC V17 6AL5
HORIZ MULT V18 6SN7GTB
HORIZ OUTPUT V19 6DQ6
HORIZ DRIVE
HORIZ. HOLD
WIDTH
HV RECT V21 1B3GT
DAMPER V20 6AX4GT
LV RECT V22 5U4GB
SW ON VOLUME CONTROL
FINE TUNING
AGC
VHF ANT. TERMINAL BOARD
UHF Crystal Clip
TEST POINT
ALTERNATE TUNER SCHEMATIC LOCATED ON PAGE 15.
ALTERNATE AUDIO AMPLIFIER SCHEMATIC LOCATED ON PAGE 16.
Connections For Robot Tuning
To Primary Of T1
Off-On Relay
Remote Control Socket
Switch On Remote Control Socket Opens When Remote Control Plug Is Inserted.
Non-Polarized
Robot Tuning Socket
AC Receptacle
Tuner Brush Drive Motor
Remote Control Unit
On-Off Switch
Left
Right
Channel Selector Switch
Cable
Robot Tuning Unit
DENOTES CHASSIS GROUND
275V SOURCE
260V SOURCE
135V SOURCE
6.3VAC
5.5VAC
To TV - Ph. Switch On Audio Amplifier Page 16
DO NOT MEASURE
BOOST 600V
HV TRANSFORMER TERMINAL BOARD
DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM. (SEE PARTS LIST)
ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)
WAVE FORMS TAKEN WITH CONTROLS SET TO PRODUCE 35 VOLTS PEAK-TO-PEAK SIGNAL AT PICTURE TUBE.
1. DC voltage measurements are at 20,000 ohms per volt. AC voltage measured at 1,000 ohms per volt.
2. Measured values are from socket pin to common negative unless otherwise stated.
3. All controls set for normal operation. No signal applied.
4. Line voltage maintained at 117 volts for voltage readings.
5. Pin numbers are counted in a clockwise direction as bottom of socket.

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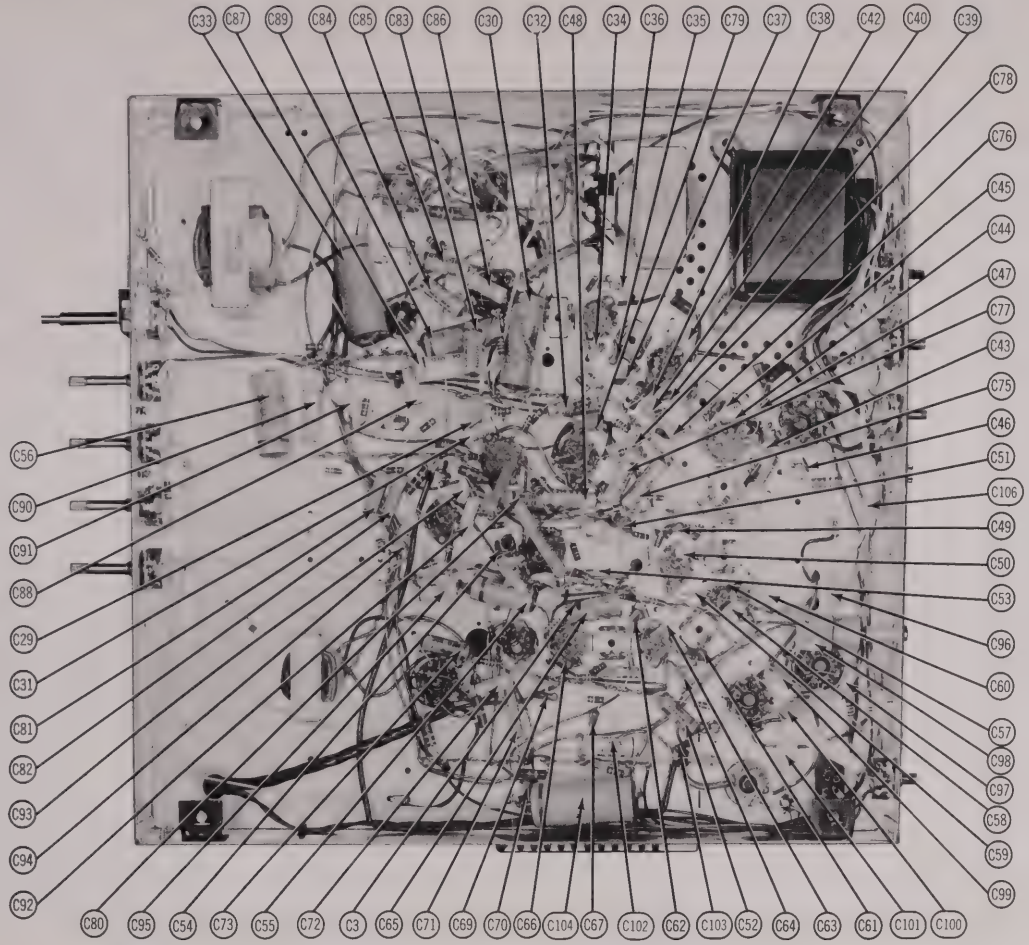

CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION

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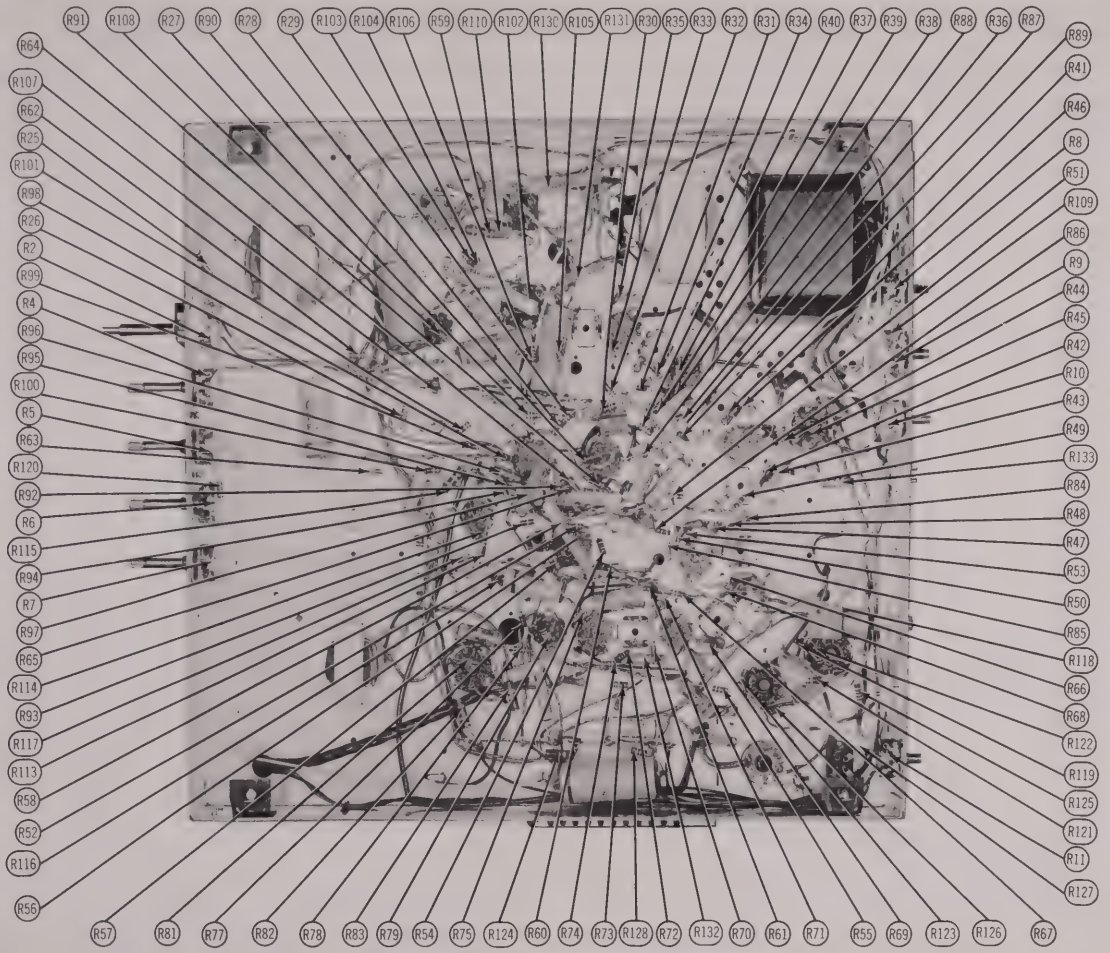

CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

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CBS-COLUMBIA MODELS 7K325, U, 7K326, U, 7K329U, 7K330U, 7K332U, 7K333U, 7K334U, 7KR329, 7KR330, 7KR332, 7KR333, 7KR334, 7KR335, 7KR336, 7T307, U, 7T309, U, 7T310, U, 7TR311, 7TR312 (Cn. 3001, 3002, 3003, 3012, 3013, 3015)

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3924 MEADE ST.
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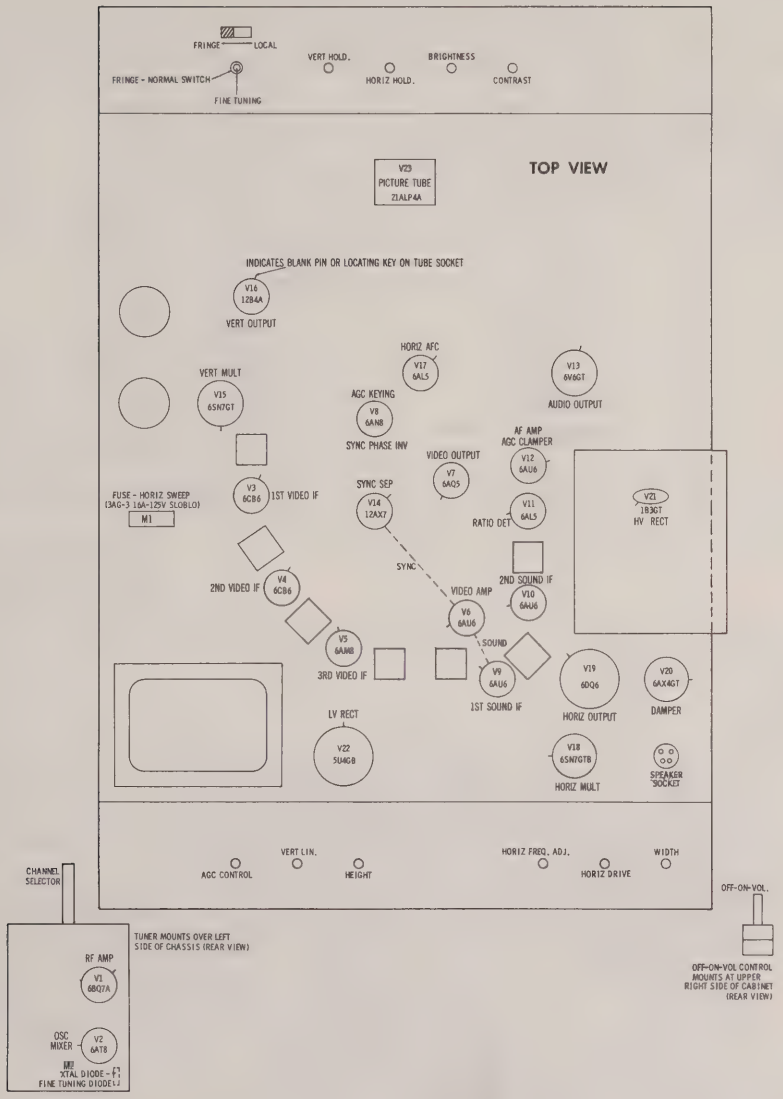
TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - V22

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - V2, V3, V4, V5
No pic, no sound, has snow - V1, V2, V3
No pic, has sound, has raster - V6, V7, V8, V23
Has pic, no sound - V9, V10, V11, V12, V13
Overloaded picture - V8, V12

SYNC FAILURE
No vert. sync - V8, V15
No horiz. sync - V8, V17, V18
No vert. or horiz. sync - V8, V14

SWEEP FAILURE
No raster, has sound - V18, V19, V20, V21, V23, Fuse (M1)
No vertical deflection - V15, V16
Poor vert. linearity or foldover - V15, V16
Poor horiz. linearity or foldover - V18, V19, V20
Narrow picture - V18, V19, V20, V21, V22
Vert. off freq. - V8, V15
Horiz. off freq. - V8, V17, V18

CBS-COLUMBIA MODELS 7K325, U, 7K326, U, 7K329U, 7K330U, 7K332U, 7K333U, 7K334U, 7KR329, 7KR330, 7KR332, 7KR333, 7KR334, 7KR335, 7KR336, 7T307, U, 7T309, U, 7T310, U, 7TR311, 7TR312 (Ch. 3001, 3002, 3003, 3012, 3013, 3015)

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To eliminate shock hazard, remove the horizontal output tube V19.

VIDEO IF ALIGNMENT

Connect the negative lead of a 3 volt bias supply to the tuner AGC terminal and the ungrounded side of C34. Connect the positive lead to chassis. Place channel selector between any two channels. This will disable the oscillator, thereby reducing the possibility of erroneous indications.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection. The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Use only enough generator output to provide usable indication on VTVM.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	Direct	High side to floating tube shield over converter tube. Low side to chassis.	Not used.	44. 8MC (unmod)	Between channels.	Use VTVM DC probe to point (A) thru 27K. Common to chassis.	A1	Adjust for maximum deflection.
2.	"	"	"	45. 75MC (unmod)	"	"	A2	"
3.	"	"	"	47. 25MC (unmod)	"	"	A3	Adjust for MINIMUM deflection.
4.	"	"	"	42. 75MC (unmod)	"	"	A4	Adjust for maximum deflection.
5.	"	"	"	41. 25MC (unmod)	"	"	A5	Adjust for MINIMUM deflection.
6.	"	"	"	43. 25MC (unmod)	"	"	A6, A7	Adjust for maximum deflection.
7.	"	"	43MC (10MC Swp)	41. 25MC 42. 45MC 45. 75MC 47. 25MC	"	"		Use only enough sweep generator output to provide usable pattern on scope. Adjust for response similar to Fig. 1. A1 affects tilt. A2 is adjusted to properly locate 45. 75MC at 50% on curve. Replace V19 in its socket.

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Connect two matched 100KΩ (±1%) resistors in series from point (C) to chassis. The junction of these two resistors is alignment point (D) as shown on the schematic.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
8.	Direct	High side to point (B). Low side to chassis.	4. 5MC (unmod)	Any	DC probe to point (C). Common to chassis.	A8, A9, A10, A11	Adjust for maximum deflection.
9.	"	"	"	"	DC probe to point (D). Common to point (E).	A12	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60~ modulation and 450KC sweep. Use 120~ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
8.	Direct	High side to point (B). Low side to chassis.	4. 5MC (450KC Swp)	4. 5MC	Any	Vert. amp. to point (B). Low side to chassis.	A8, A9, A10, A11	Disconnect stabilizing capacitor C3. Adjust for curve of maximum amplitude and symmetry as in Fig. 2.
9.	"	"	"	"	"	Vert. amp. to point (E). Low side to chassis.	A12	Reconnect C3. Adjust so as to place 4. 5MC is at center of crossover lines as in Fig. 3. SLIGHTLY retouch A11 for maximum amplitude and straightness of crossover lines.

4.5MC TRAP ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
10.	1000MMF	High side thru 1000MMF to pin 7 (grid) of 6AQ5 (V7). Low side to chassis.	4. 5MC (unmod)	Any	DC probe thru high impedance crystal probe to point (F). Common to chassis.	A13	Adjust for MINIMUM deflection.

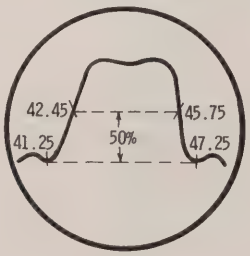


FIG.1

FIG.2

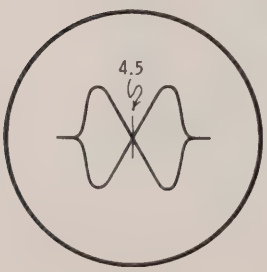


FIG. 3

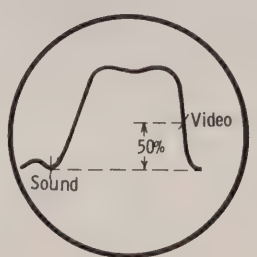


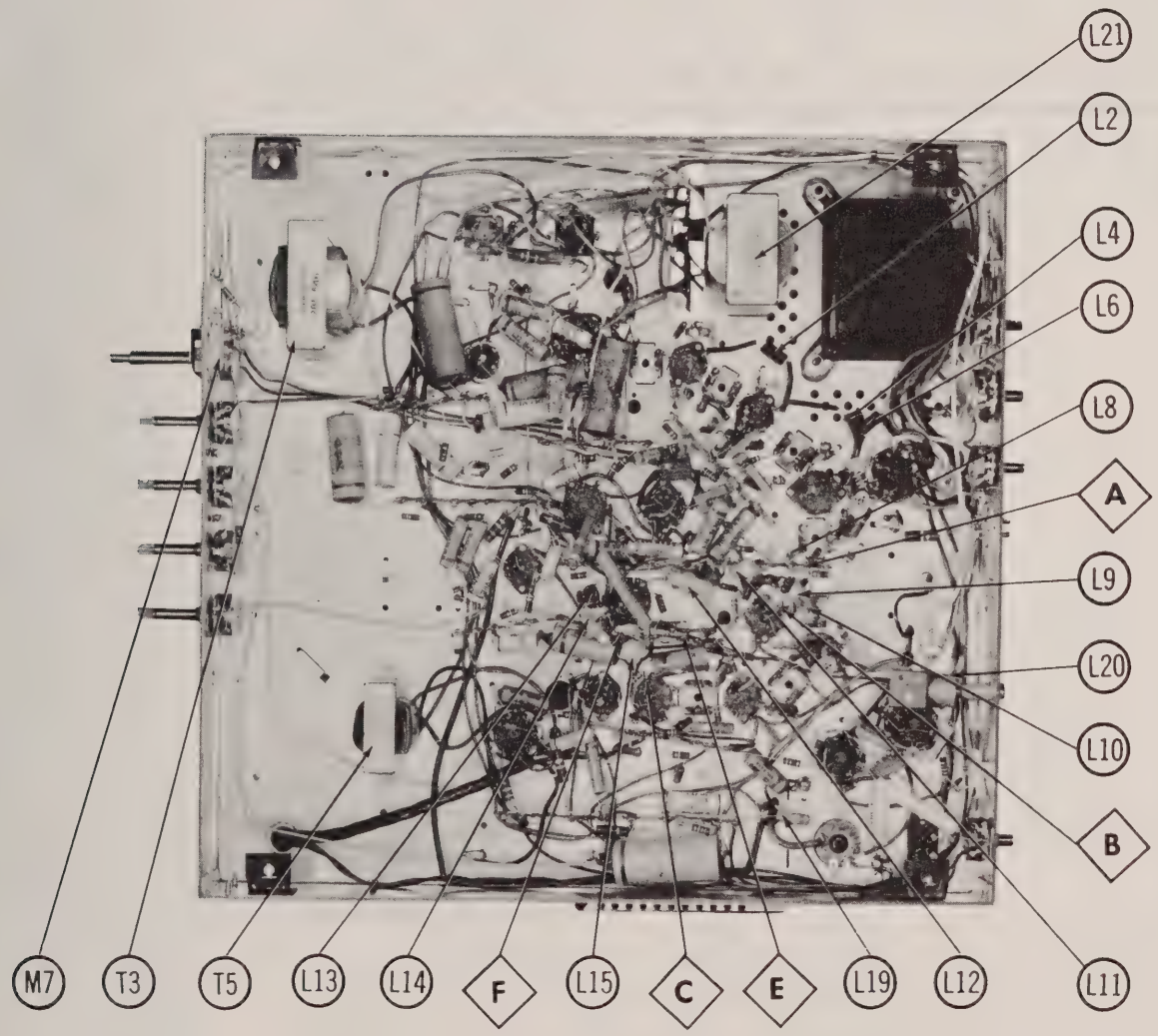
FIG.4

ALIGNMENT INSTRUCTIONS (cont)

OSCILLATOR ALIGNMENT

Leave bias connected as under "Video IF Alignment". Remove 6DQ6 (V19) to eliminate high voltage shock hazard.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

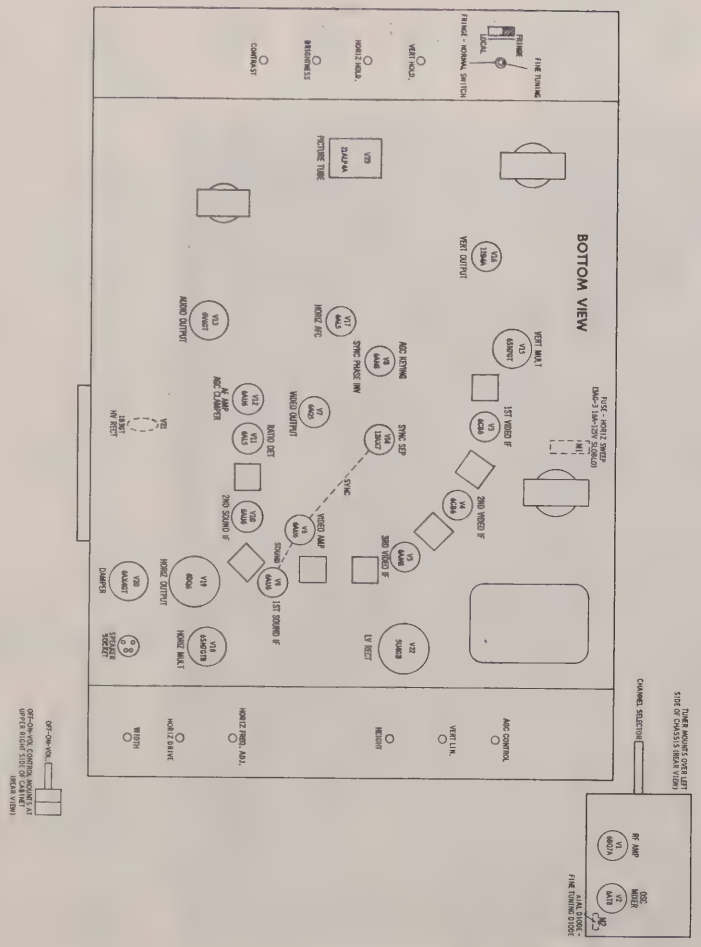
	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
11.	Two 120Ω carbon resistors.	Across antenna terminals with 120Ω in each lead.	213MC (10MC Swp)	211. 25MC 215. 75MC	13	Vert. amp. thru 47K to point Ⓐ. Low side to chassis.	A14	Adjust to place sound marker in trap notch as in Fig. 4. Video marker should fall at 50%. Replace V19 in its socket. Remove bias.
			207MC (10MC Swp)	205. 25MC 209. 75MC	12		A15	
			201MC (10MC Swp)	199. 25MC 203. 75MC	11		A16	
			195MC (10MC Swp)	193. 25MC 197. 75MC	10		A17	
			189MC (10MC Swp)	187. 25MC 191. 75MC	9		A18	
			183MC (10MC Swp)	181. 25MC 185. 75MC	8		A19	
			177MC (10MC Swp)	175. 25MC 179. 75MC	7		A20	
			85MC (10MC Swp)	83. 25MC 87. 75MC	6		A21	
			79MC (10MC Swp)	77. 25MC 81. 75MC	5		A22	
			69MC (10MC Swp)	67. 25MC 71. 75MC	4		A23	
			63MC (10MC Swp)	61. 25MC 65. 75MC	3		A24	
			57MC (10MC Swp)	55. 25MC 59. 75MC	2		A25	



CBS-COLUMBIA MODELS 7K325, U, 7K326, U, 7K329U, 7K330U, 7K332U, 7K333U, 7K334U, 7KR329, 7KR330, 7KR332, 7KR333, 7KR334, 7KR335, 7KR336, 7T307, U, 7T309, U, 7T310, U, 7TR311, 7TR312 (Ch. 3001, 3002, 3003, 3012, 3013, 3015)

CHASSIS BOTTOM VIEW-TRANS., INDUCTOR & ALIGN. IDENTIFICATION

TUBE PLACEMENT CHART



RESISTANCE MEASUREMENTS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	6BQ7A	INF	500K	47Ω	0Ω	.1Ω	†1200Ω	250K	INF	0Ω
V2	6AT8	10K	†10K	0Ω	0Ω	.1Ω	†6000Ω	†50K	0Ω	220K
V3	6CB6	80K	56Ω	0Ω	.1Ω	▲470Ω	▲470Ω	0Ω		
V4	6CB6	250K	▲39Ω	0Ω	.1Ω	†540Ω	†540Ω	250K		
V5	6AM8	120Ω	.1Ω	†50K	.1Ω	0Ω	†6600Ω	.2Ω	4700Ω	0Ω
V6	6AU6	4700Ω	0Ω	0Ω	.1Ω	†10K	†5000Ω	82Ω		
V7	6AQ5	750K	● 350Ω	.1Ω	0Ω	†4000Ω	†27K	750K		
V8	6AN8	†3300Ω	†500K	†6000Ω	0Ω	.1Ω	300K	†69Ω	†35K	†5000Ω
V9	6AU6	100K	0Ω	.1Ω	0Ω	†5500Ω	†5500Ω	120Ω		
V10	6AU6	100K	0Ω	.1Ω	0Ω	†540Ω	†5500Ω	0Ω		
V11	6AL5	1Meg	1Meg	.6Ω	0Ω	0Ω	0Ω	27K		
V12	6AV6	10Meg	3.9Ω	.1Ω	0Ω	500K	500K	†470K		
V13	6V6GT	NC	0Ω	†305Ω	†15K	470K	TP	.1Ω	335Ω	
V14	12AX7	†70K	2.2Meg	0Ω	0Ω	0Ω	†70K	2.7Meg	0Ω	.1Ω
V15	6SN7GT	●1.5Meg	▬●2.5Meg	680Ω	4700Ω	†150K	680Ω	0Ω	.1Ω	
V16	12B4A	●900Ω	2.2Meg	0Ω	.1Ω	.1Ω	NC	2.2Meg	NC	†1300Ω
V17	6AL5	27K	27K	0Ω	.6Ω	3.5Meg	0Ω	3.5Meg		
V18	6SN7GTB	3.8Meg	†7800Ω	1500Ω	●90K	†100K	1500Ω	0Ω	.1Ω	
V19	6DQ6	TP	.1Ω	TP	●†12K	400K	TP	0Ω	0Ω	TOP CAP ▰20Ω
V20	6AX4GT	NC	NC	INF	NC	†75Ω	NC	.1Ω	0Ω	
V21	1B3GT	PINS 1 - 8 HAVE INFINITE RESISTANCE								TOP CAP ▰705Ω
V22	5U4GB	TP	40K	TP	24Ω	TP	25Ω	TP	40K	
V23	21ALP4A	0Ω	1Meg	Pin 6 †5000Ω	Pin 10 ▰680K	Pin 11 ●†170K	Pin 12 .1Ω			

† MEASURED FROM PIN 8 OF V22.
▲ MEASURED FROM PIN 7 OF V4.
■ THIS READING WILL VARY. CONTROL SET FOR NORMAL OPERATION.
▰ MEASURED FROM PIN 3 OF V20.
TP TIE POINT
NC NO CONNECTION

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

CHASSIS TOP VIEW

CBS-COLUMBIA MODELS 7K325, U, 7K326, U, 7K329U, 7K330U, 7K332U, 7K333U, 7K334U, 7KR329, 7KR330, 7KR332, 7KR333, 7KR334, 7KR335, 7KR336, 7T307, U, 7T309, U, 7T310, U, 7TR311, 7TR312 (Ch. 3001, 3002, 3003, 3012, 3013, 3015)

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	VHF RF Amp.	6BQ7A	
V2	VHF Mixer-Osc.	6AT8	
V3	1st Video IF Amp.	6CB6	
V4	2nd Video IF Amp.	6CB6	
V5	3rd Video IF Amp. - Video Det.	6AM8	
V6	Video Amp.	6AU6	
V7	Video Output	6AQ5	
V8	AGC Keying-Sync Phase Inv.	6AN8	
V9	1st Sound IF Amp.	6AU6	
V10	2nd Sound IF Amp.	6AU6	

ITEM No.	USE	TYPE	NOTES
V11	Ratio Det.	6AL5	
V12	AGC Clamper-AF Amp.	6AV6	
V13	Audio Output	6V6GT	
V14	Sync Sep.	12AX7	
V15	Vert. Mult.	6SN7GT	
V16	Vert. Output	12B4A	
V17	Horiz. AFC	6AL5	
V18	Horiz. Mult.	6SN7GTB	
V19	Horiz. Output	6DQ6	
V20	Damper	6AX4GT	
V21	HV Rectifier	1B3GT	
V22	LV Rectifier	5U4GB	

PICTURE TUBE

ITEM No.	REPLACEMENT DATA				NOTES
	CBS-Columbia PART No.	CBS PART No.	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	
V23	21ALP4A ①	21ALP4A ① 21ALP4	21ALP4A ① 21ALP4A/B ①	 21ALP4A/B ②	① Aluminized ② Silver Screen "85"

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	CBS-Columbia PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	▲40	350	21001151	AFH4-18-30	D121	FP447	TMT-39 TD-20-350	Q-015 MTD-4510	TVL-4773
B	40	350							
C	■20	350							
D	▲20	350							
C2A	■10	350	21001162	AFH4-56-93. 4	C032 BRH501	FP459	TMT-36 TD-100-50	D-342 MTD-4510	R2303*
B	▲40	350							
C	100	50							
D	▲10	350							
C3	1	100	21000521	PRS450V1	BR145	TC40		MMT-4501	R2060*

* Non catalog item.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	CBS-Columbia PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C4	120			N750-SI120	TCN-120	N044	N750L-121		5TCU-T12	
C5	5									
C6	6.8									
C7	6.8									
C8	3-15									
C9	2.2			NP0-SI2.2	TCZ-2R2	TZ05	NP0A-2R2		5TCCB-V22	
C10	1000									
C11	1000			BPD-001	DD-102	K069	801-001	DC521	5HK-D1	
C12	.5-3				829-3		3115-01-0R5	CT565A		
C13	1000									
C14	1000			BPD-001	DD-102	K069	801-001	DC521	5HK-D1	
C15	.5-5									
C16	60									
C17	1.5			NP0-SI1.5	TCZ-1R5	TZ04	NP0A-1R5	ZT-5515	5TCCB-V15	
C18	8.2									
C19	10									
C20	1.5			NP0-SIL5	TCZ-1R5	TZ04	NP0A-1R5	ZT-5515	5TCCB-V15	
C21	2.2			NP0-SI2.2	TCZ-2R2	TZ05	NP0A-2R2		5TCCB-V22	
C22	1000									
C23	47			N750-SI47	TCN-47	N033	N750K-470	ZT-5447	5TCC-Q47	
C24	1000			BPD-001	DD-102	K069	801-001	DC521	5HK-D1	
C25	1000									
C26	1000			BPD-001	DD-102	K069	801-001	DC521	5HK-D1	
C27	1000									
C28	1000									
C29	5000		23064680	BPD-005	DD-502	K080	811-005	DC525	5HK-D5	Note 1
C30	.27	200	22011330	P288N-27		CUB2P25		PT4025	2TM-P25	
C31	.001	600	22017540	BPD-001	D6-102	CUB6D1	GP3-333-103	PT621	6TM-D1	
C32	.0047	400	22011620	BPD-0047	D6-472	CUB6D47	GP2-333-472	PT6247	6TM-D47	
C33	1.0	100	22010850	P288N-1.0		ST4W1		PT41	2M-M1	
C34	1500		23064640	BPD-0015	DD-152	K071	801-0015	DC5215	5HK-D15	
C35	390		23001190	SI390	D6-391	TP44	GP2K-391	UC-5339	5GA-T39	
C36	1500		23064640	BPD-0015	DD-152	K071	801-0015	DC5215	5HK-D15	
C37	1500		23064640	BPD-0015	DD-152	K071	801-0015	DC5215	5HK-D15	
C38	20000		23066330	BPD-02	DF-203	K085	817-02	PT412	5HK-S2	
C39	470		23001200	SI470	D6-471	TP46	811-471	UC-5347	5GA-T47	
C40	1500		23064640	BPD-0015	DD-152	K071	801-0015	DC5215	5HK-D15	
C41	1500		23064640	BPD-0015	DD-152	K071	801-0015	DC5215	5HK-D15	Note 2
C42	1500		23064640	BPD-0015	DD-152	K071	801-0015	DC5215	5HK-D15	
C43	5000		23064680	BPD-005	DD-502	K080	811-005	DC525	5HK-D5	
C44	560		23000711	SI560	D6-561	TP48	GP2K-561	UC-5356	5GA-T56	
C45	1500		23064640	BPD-0015	DD-152	K071	801-0015	DC5215	5HK-D15	
C46	1500		23064640	BPD-0015	DD-152	K071	801-0015	DC5215	5HK-D15	
C47	1500		23064640	BPD-0015	DD-152	K071	801-0015	DC5215	5HK-D15	
C48	.033	200	22011220	BPD-03	DF-303	CUB6S33		PT6133	6TM-S33	
C49	1500		23001760	SI1500	D6-152	TP54	GP2L-152	UC-5215	5GA-D15	
C50	1500		23064640	BPD-0015	DD-152	K071	801-0015	DC5215	5HK-D15	
C51	.1	200	22011280	P288N-1	DF-104	CUB2P1		PT401	2TM-P1	
C52	.1	200	22011280	P288N-1	DF-104	CUB2P1		PT401	2TM-P1	
C53	.01	400	22017160	BPD-01	D6-103	CUB4S1	GP3-333-103	PT411	4TM-S1	
C54	47			NP0-SI47	D6-470	TZ22	831-471	ZT-5447	5TCC-Q47	
C55	.1	400	22011780	P488N-1	DF-104	CUB4P1		PT401	4TM-P1	
C56	.27	400	22011830	P488N-27		CUB4P25		PT4025	4TM-P25	
C57	180	500		1469-00018	TCZ-180	22R5T18	NP0-334-181		5TCC-T18	
C58	5000		23064680	BPD-005	DD-502	K080	811-005	DC525	5HK-D5	
C59	5000		23064680	BPD-005	DD-502	K080	811-005	DC525	5HK-D5	
C60	5000		23064680	BPD-005	DD-502	K080	811-005	DC525	5HK-D5	
C61	1500		23001760	SI1500	D6-152	K071	801-0015	DC5215	5HK-D15	
C62	5000		23064680	BPD-005	DD-502	K080	811-005	DC525	5HK-D5	Note 2
C63	5000		23064680	BPD-005	DD-502	K080	811-005	DC525	5HK-D5	
C64	5000		23064680	BPD-005	DD-502	K080	811-005	DC525	5HK-D5	
C65	5000		23064680	BPD-005	DD-502	K080	811-005	DC525	5HK-D5	
C66	82		23001110	SI82	D6-820	G040	GP1K-820	UC-5482	5GA-Q82	
C67	820		23001730	SI82	D6-821		811-821		5GA-T82	
C68	1500		23001760	SI1500	D6-152	K071	GP2L-152	UC-5215	5GA-D15	Note 2
C69	1500		23001760	SI1500	D6-152	K071	GP2L-152	UC-5215	5GA-D15	
C70	270	500	20003940	SI270	D6-271	5W5T27	811-271	UC-5327	5GA-T27	
C71	.0047	400	22011620	BPD-0047	D6-472	CUB6D47	GP2-333-472	PT6247	6TM-D47	

ITEM No.	RATING		CBS-Columbia PART No.	AEROVOX PART No.	CENTRA PART
	CAP.	VOLT			
C72	.01	400	22017160	BPD-01	D6-103
C73	.0033	1000	22012100	P1088N-0033	DD16-3
C74	.047	200	22011240	BPD-05	DF-503
C75	.033	200	22011220	BPD-03	DF-303
C76	560	500	20004030	SI560	D6-561
C77	.022	200	22011200	BPD-02	DF-203
C78	390	500	20003980	SI390	D6-391
C79	220	500	20003910	SI220	D6-221
C80	.033	200	22011220	BPD-03	DF-303
C81	.0047	600	22012120	BPD-0047	D6-472
C82	.0047	600	22012120	BPD-0047	D6-472
C83	.047	200	22011240	BPD-05	DF-503
C84	.022	200	22011200	BPD-02	DF-203
C85	.033	200	22011220	BPD-03	DF-303
C86	.0056	400	22008130	1464-0056	
C87	.047	600	22015240	BPD-05	DF-503
C88	.01	400	22017160	DI-01	D6-103
C89	.1	600	22012280	P688N-1	DF-104
C90	.047	400	22017240	BPD-05	DF-503
C91	.047	400	22017240	BPD-05	DF-503
C92	.001	600	22017540	DI-001	D6-102
C93	.001	600	22017540	DI-001	D6-102
C94	.0047	600	22017620	DI-0047	D6-472
C95	.0047	600	22017620	DI-0047	D6-472
C96	.033	200	22016720	BPD-03	DF-303
C97	560	500	20004030	1464-00056	
C98	3900	500	20013120	1464-0039	
C99	390	500	20003980		D6-391
C100	470	500	20004000	SI470	D6-471
C101	.047	400	22017240	BPD-05	DF-503
C102	.047	400	22017240	BPD-05	DF-503
C103	470		23001200	SI470	D6-471
C104	.47	600	22012340	P688N-47	
C105	120	2500			DD30-3
C106	1500		23064640	BPD-0015	DD-152

Note 1: Some versions may use .047MFD unit (part #220
Note 2: Not used in some versions.

CON

ITEM No.	RATING		REPLACEME		
	RESIST-ANCE	WATTS	CBS-Columbia PART No.	CENTRALAB PART No.	CLARC PART
R1A	1Meg	½	36001601	B-70-S	A47-1M
B	Shaft		Not Req.	Not Req.	FS-3
C	Switch		Not Req.	Not Req.	SWE-12
R2A	20K	½	36001581	B-23	A47-25
B	Shaft		Not Req.	Not Req.	RS-3/16
R3A	20K	½	3601581	B-23	A47-25
B	Shaft		Not Req.	Not Req.	RS-3/16
R4A	1Meg	½	36001612	AB-69	A47-1M
B	Shaft		Not Req.	AK-4	KSS-3
R5A	5000Ω	½	36001613	AB-10	A47-50
B	Shaft		Not Req.	AK-4	KSS-3
R6A	100K	½	36001611	AB-40	A47-100
B	Shaft		Not Req.	AK-4	KSS-3
R7A	2500Ω	½	36001615	AB-12	
B	Shaft		Not Req.	AK-4	
R8A	5Meg	½	36001622	AB-87	A47-5M
B	Shaft		Not Req.	AK-19	RN-3
R9A	2500Ω	1	36001591		
B	Shaft		Not Req.		
R10A	2.5Meg	½	36001621	AB-83	A47-2.5
B	Shaft		Not Req.	AK-1	FKS-½
R11A	15K	2	36001592		
B	Shaft		Not Req.		

Note 1: Chassis 3015 will use an alternate control part no. 3
3013 will use an alternate control part no. 3600164L.
Note 2: Used in chassis 3012, 3013 and 3015 only.
Note 3: Chassis 3015 will use an alternate control part no. 3

RES

All wattages 1/2 watt, or

ITEM No.	RATING		REPLACEMENT DATA		NOTE
	OHMS	WATT	CBS-Columbia PART No.	IRC PART No.	
R12	680K			BTS-680K	
R13	4700Ω			BTS-4700	
R14	47Ω			BTS-47	
R15	560K			BTS-560	
R16	470K			BTS-470K	
R17	1200Ω			BTS-1200	
R18	220K			BTS-220K	
R19	8200Ω			BTS-8200	
R20	5600Ω			BTS-5600	
R21	10K			BTS-10K	
R22	22K			BTS-22K	
R23	1000Ω			BTS-1000	
R24	47K			BTS-47K	
R25	470Ω		30471330	BTS-470	
R26	1.8Meg		30185230	BTS-1.8Meg	
R27	4700Ω		30472230	BTS-4700	
R28	270K		30274230	BTS-270K	
R29	150K		30154230	BTS-150K	
R30	150K		30154230	BTS-150K	
R31	56K		30563230	BTS-56K	
R32	470Ω		30471330	BTS-470	
R33	27K		30273230		
R34	470Ω		30471330	BTS-470	
R35	56Ω		30560230	BTS-56	
R36	470Ω		30471330	BTS-470	
R37	39Ω		30390230	BTS-39	
R38	12K		30123230	BTS-12K	
R39	470K		30474230	BTS-470K	
R40	470K		30474230	BTS-470K	
R41	56K		30563230		
R42	27K		30273230		Note
R43	5600Ω	1	30562240	BTA-5600	
R44	47K	1	30473240	BTA-47K	Note
R45	1000Ω		30102230	BTS-1000	Note
R46	120Ω		30121230	BTS-120	

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No	USE	TYPE	NOTES
V1	VHF RF Amp	6BQ7A	
V2	VHF Mixer-Osc	6AL8	
V3	1st Video IF Amp	6CB6	
V4	2nd Video IF Amp	6CB6	
V5	3rd Video IF Amp		
	Sound Amp	6AM8	
V6	Video Amp	6AU6	
V7	Video Output	6AQ5	
V8	Audio Amp		
	Sync Phase Inv	6AN8	
V9	1st Sound IF Amp	6AL8	
V10	2nd Sound IF Amp	6AL8	

ITEM No	USE	TYPE	NOTES
V11	Ratio Det	6AL8	
V12	Non-Clamper-AF Amp	6AV6	
V13	Audio Output	6V6GT	
V14	Sync Sep	12AT	
V15	Vert Mult	6SN7GT	
V16	Vert Output	12H4A	
V17	Horiz AFC	6AL5	
V18	Horiz Mult	6SN7GTB	
V19	Horiz Output	6DQ6	
V20	Damper	6AX4GT	
V21	HV Rectifier	1B3GT	
V22	LV Rectifier	5U4GB	

PICTURE TUBE

ITEM No	REPLACEMENT DATA				NOTES
	CBS-Columbia PART No.	CBS GENERAL ELECTRIC	SYLVANIA PART No		
V23	21ALP4A ①	21ALP4A ①		① Aluminized	
	21ALP4 ①	21ALP4A/B ①	21ALP4A/B ②	② Silver Screen "B5"	

ELECTROLYTIC CAPACITORS

ITEM No	RATING CAP	VOLT	REPLACEMENT DATA CBS-Columbia PART No	AEROVOX CORNELL DUBILIER PART No	MALLORY PART No	PYRAMID PART No	SANGAMO PART No	SPRAGUE PART No	NOTES
C1A	40	350	3100U5	ATH4-40-350	DU1	FP447	TMT-39-TD-20-350	U-015 TD-40-450	TVL-4773
B	40	350							
C	20	350							
D	20	350							
C2A	40	350	3100U62	ATH4-56-93.4/C032 R3R850I		FP459	TMT-36 TD-100-50	U-345 U-MTD-450	R2305*
B	40	350							
C	100	50							
D	40	350							
C3	100	100	31000S2①	PRH340V1	BR145	TC40		MMT-450	R2080*

* Non catalog item

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No	RATING CAP	VOLT	REPLACEMENT DATA CBS-Columbia PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C1	120			N750-SU20	TCN-120	N044	N750L-121			STCU-T1E	
C2	5										
C3	6.8										
C4	3.3										
C5	3-15										
C6	2.2			NP0-SL2.2	TCZ-2R2	TZ05	NP0A-2R2			STCCB-V22	
C7	100										
C8	1000			BPD-001	DD-102	K069	801-001	DC521		SHK-D1	
C9	5.1				523-2		3105-01-0R5	DC5R1A			
C10	1000										
C11	1000			BPD-001	DD-102	K069	801-001	DC521		SHK-D1	
C12	5.1										
C13	1.5			NP0-SIL 5	TCZ-1R5	TZ04	NP0A-1R5	ZT-5515		STCCB-V15	
C14	8.2										
C15	10										
C16	2.5			NP0-SIL 5	TCZ-1R5	TZ04	NP0A-1R5	ZT-5515		STCCB-V15	
C17	1.5			NP0-SIL 2	TCZ-2R2	TZ05	NP0A-2R2			STCCB-V22	
C18	2.2										
C19	47			N750-SU47	TCN-47	N033	N750K-470	ZT-5447		STCC-Q47	
C20	1000			BPD-001	DD-102	K069	801-001	DC521		SHK-D1	
C21	1000										
C22	1000			BPD-001	DD-102	K069	801-001	DC521		SHK-D1	
C23	1000										
C24	5000	400	33064880	BPD-005	DD-502	KD80	811-005	DC525		SHK-D5	Note 1
C30	27	300	33013300	P388M-27		CUBD2P5		PT4025		STM-P25	
C31	001	600	33015540	BPD-001	DE-101	CUBD4D	GP3-333-101	PT501		STM-D1	
C32	0047	400	33001850	BPD-0047	DE-473	CUBD4D47	GP3-333-473	PT6247		STM-D47	
C33	1.0	100	33010850	P188M-1.0		ST4W1		PT41		ZM-M1	
C34	500		33064840	BPD-005	DD-152	KD71	801-005	DC525		SHK-D15	
C35	330		33001180	811S0		DP44	GP2E-381	DC-5330		SGA-T39	
C36	500		33064840	BPD-005	DD-152	KD71	801-005	DC525		SHK-D15	
C37	1500		33064940	BPD-015	DD-152	KD71	801-015	DC5215		SHK-D15	
C38	20000		33086330	BPD-03		DF-301	8S163	617-02		STM-P3	
C39	5000		33064880	BPD-005		DD-471	TP48	811-471		SGA-T47	
C40	1500		33064940	BPD-015	DD-152	KD71	801-015	DC5215		SHK-D15	
C41	1500		33064940	BPD-015	DD-152	KD71	801-015	DC5215		SHK-D15	Note 2
C42	500		33064840	BPD-005	DD-152	KD71	801-015	DC525		SHK-D15	
C43	5000		33064880	BPD-005	DD-502	KD80	811-005	DC525		SHK-D5	
C44	1500		33064940	BPD-015	D6-561	TP48	GP3E-561	VC-5356		SGA-T56	
C45	1500		33064940	BPD-015	DD-152	KD71	801-015	DC5215		SHK-D15	
C46	1500		33064940	BPD-015	DD-152	KD71	801-015	DC5215		SHK-D15	
C47	1500		33064940	BPD-015	DD-152	KD71	801-015	DC5215		SHK-D15	
C48	1000	200	33012350	811S0		CUBD833		PT4133		STM-S33	
C49	1500		33001780	811S0		TP54	GP3L-152	VC-5215		SGA-D15	
C50	1500		33064940	BPD-015	DD-152	KD71	801-015	DC5215		SHK-D15	
C51	1	200	33013280	P188M-1		CUBD1P		PT401		2TM-P1	
C52	1	200	33013280	P188M-1		DF-104		PT401		2TM-P1	
C53	001	500	33001780	BPD-01		DD-103	GP3-333-103	PT411		4TM-S1	
C54	47			M29-S147		D6-470	T233	831-471		ST-5447	STCC-Q47
C55	1	400	33011780	P488M-1		DF-104		CUB4P1		4TM-P1	
C56	2.7	400		P488M-2.7				CUB4P25		4TM-P25	
C57	180	500		1469-0001E			3R9S14	NP0-534-181		STCC-T18	
C58	5000		33064880	BPD-005	DD-502	KD80	811-005	DC525		SHK-D5	
C59	5000		33064880	BPD-005	DD-502	KD80	811-005	DC525		SHK-D5	
C60	5000		33064880	BPD-005	DD-502	KD80	811-005	DC525		SHK-D5	
C61	1500		33001780	811S0		DD-153	KD71	801-015	DC5215	SHK-D15	
C62	5000		33064880	BPD-005	DD-502	KD80	811-005	DC525		SHK-D5	Note 2
C63	5000		33064880	BPD-005	DD-502	KD80	811-005	DC525		SHK-D5	
C64	5000		33064880	BPD-005	DD-502	KD80	811-005	DC525		SHK-D5	
C65	5000		33064880	BPD-005	DD-502	KD80	811-005	DC525		SHK-D5	
C66	5000		33064880	BPD-005	DD-502	KD80	811-005	DC525		SHK-D5	
C67	820		33001700	811S0		DE-821					
C68	1500		33001780	811S0		D6-152	KD71	GP3L-152	VC-5215	SGA-D15	Note 2
C69	1500		33001780	811S0		D6-152	KD71	GP3L-152	VC-5215	SGA-D15	
C70	270	500	33003940	811S0		D6-271	SWE1X7	811-271	VC-5327	SGA-T27	
C71	.0047	400	33013E80	BPD-0047		DE-472	CUBD4D47	GP3-333-473	PT6247	6TM-D47	

CONTROLS

ITEM No	RATING RESISTANCE	WATTS	REPLACEMENT DATA CBS-Columbia PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	1Meg		33001801	B-70-8	A47-1Meg-2	Q13-137	U53	Volume - Note 1
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R1A
C	Switch		Not Req.	Not Req.	SWB-12	76-1	US-26	Attach to R1A
R2A	20K		33001581 ①	B-33	A47-2K-V	Q18-119	U28	Fine Tuning
B	Shaft		Not Req.	Not Req.	RS-3/16	Not Req.	DS-37	Attach to R2A
R4A	1Meg		33001612	AB-59	A47-1Meg-c	Q11-137	U34	Vert Hold
B	Shaft		Not Req.	AE-4	KSB-3	Not Req.	Not Req.	Attach to R4A
R5A	5000Ω		33001613	AB-10	A47-5000-S	Q11-114	U14	Horiz. Hold
B	Shaft		Not Req.	AE-4	KSB-3	Not Req.	Not Req.	Attach to R5A
R6A	100K		33001611	AB-60	A47-100K-E	Q11-128	U30	Brightness - Note 3
B	Shaft		Not Req.	AE-4	KSB-3	Not Req.	Not Req.	Attach to R6A
R7A	2500Ω		33001615 ①	AB-13		Q17-111	U7	Contrast
B	Shaft		Not Req.	AE-4		Not Req.	Not Req.	Attach to R7A
R8A	1Meg		33001622	AB-87	A47-1Meg-g	Q11-141	PTA5EL	AGC
B	Shaft		Not Req.	AE-19	RH-3	Not Req.	Not Req.	Attach to R8A
R9A	2500Ω		33001561			WP8250	B3500L	Vert. Linearity
B	Shaft		Not Req.				DS-38	Attach to R9A
R10A	2.5Meg	②	33001621	AB-83	A47-2.5Meg-G	Q11-339	TA3151	Height
B	Shaft		Not Req.	AE-1	FKS-4	Not Req.	Not Req.	Attach to R10A
R11A	15K	2	33001503			WPK-15000	R15ML	Width
B	Shaft		Not Req.				DS36	Attach to R11A

Note 1: Chassis 3025 will use an alternate control part no. 33001583, also chassis 3003 and 3013 will use an alternate control part no. 33001641.
Note 2: Used in chassis 3012, 3013 and 3015 only.
Note 3: Chassis 3015 will use an alternate control part no. 33001661.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No	RATING OHMS	WATT	REPLACEMENT DATA CBS-Columbia PART No.	IRC PART No.	NOTES
R12	680K		BTS-680K	BTS-680K	
R13	470Ω		BTS-470	BTS-4700	
R14	47Ω		BTS-47	BTS-470	
R15	680K		BTS-680	BTS-6800	
R16	470K		BTS-470K	BTS-4700	
R17	1200Ω		BTS-1200	BTS-1900	
R18	220K		BTS-220K	BTS-82	
R19	8200Ω		BTS-8200	BTS-470K	
R20	5800Ω		BTS-5800	BTS-4.7Meg	
R21	10K		BTS-10K	BTS-1Meg	
R22	22K		BTS-22K	BTS-4800	
R23	1000Ω		BTS-1000	BTS-4700 5% 7	
R24	47K		BTS-47K	BTS-270K	
R25	470Ω		BTS-470	BTS-4700	
R26	1.5Meg		BTS-1.5Meg	BTS-1Meg	
R27	470Ω		BTS-470	BTS-150K	
R28	270K		BTS-270K	BTS-27K	
R29	150K		BTS-150K	BTS-150K	
R30	150K		BTS-150K	BTS-150K	
R31	56K		BTS-56K	BTS-100K	
R32	470Ω		BTS-470	BTS-4700	
R33	27K		BTS-27K	BTS-120	
R34	470Ω		BTS-470	BTS-4700	
R35	56Ω		BTS-56	BTS-470	Note 1
R36	470Ω		BTS-470	BTS-4700	
R37	39Ω		BTS-39	BTS-180	
R38	12K		BTS-12K	BTS-100K	
R39	470K		BTS-470K	BTS-47K	
R40	470K		BTS-470K	BTS-27K	
R41	56K		33063320	BTS-470	Note 1
R42	27K		33073230	BTS-100K	
R43	5600Ω	1	33063340	BTS-5600	
R44	47K	1	33073340	BTS-47K	Note 2
R45	1000Ω		33013330	BTS-1000	Note 1
R46	130Ω		BTS-130	BTS-470K	

ITEM No	RATING OHMS	WATT	REPLACEMENT DATA CBS-Columbia PART No.	IRC PART No.	NOTES
R47	680Ω		33063310	BTS-4800	
R48	180Ω		33063230	BTS-4800	
R49	4700Ω		33073230	BTS-4700	
R50	15000Ω	5%	33013270	BTS-1500 5%	
R51	10K		33013230	BTS-10K	
R52	1900Ω		33012E30	BTS-1900	
R53	82Ω		33020230	BTS-82	
R54	470K		33074230	BTS-470K	
R55	4.7Meg		33073E30	BTS-4.7Meg	
R56	1Meg		33013230	BTS-1Meg	
R57	4800Ω		33063E30	BTS-4800	
R58	4000Ω	5%	31000S35	PW7-4000 5%	
R59	27K		33073230	BTS-27K	
R60	82Ω		33020230	BTS-82	
R61	1Meg		33013230	BTS-1Meg	
R62	150K		33015230	BTS-150K	
R63	27K		33073230	BTS-27K	
R64	27K		33073230	BTS-27K	
R65	150K		33015230	BTS-150K	
R66	100K		33014230	BTS-100K	
R67	100K		33014230	BTS-100K	
R68	120Ω		33012230	BTS-120	
R69	100K		33014230	BTS-100K	
R70	470Ω		33073230	BTS-470	
R71	470Ω		33073230	BTS-470	
R72	180Ω		33018230	BTS-189	
R73	100K		33014230	BTS-100K	
R74	27K		33073230	BTS-27K	
R75	27K		33073230	BTS-27K	
R76	470Ω		33073230	BTS-470	
R77	10Meg		33063230	BTS-10Meg	
R78	470K		33074230	BTS-470K	
R79	3.9Ω		33009150	BW1-3.9	
R80	4700Ω		33073230	BTS-4700	
R81	470K		33074230	BTS-470K	

RESISTORS (cont)

ITEM No	RATING OHMS	WATT	REPLACEMENT DATA CBS-Columbia PART No.	IRC PART No.	NOTES
R82	330Ω	1	33033140	BTA-330	
R83	15K	1	33032E40	BTA-15K	
R84	100K		33014230	BTS-100K	
R85	56K		33063230	BTS-56K	
R86	12K		33023230	BTS-12K	
R87	27K		33073230	BTS-27K	
R88	470K		33074230	BTS-470K	
R89	2.2Meg		33023230	BTS-2.2Meg	
R90	2.2Meg		33023230	BTS-2.2Meg	
R91	100K		33014230	BTS-100K	
R92	150K		33015230	BTS-150K	
R93	1Meg		33013230	BTS-1Meg	
R94	27K		33073230	BTS-27K	
R95	1Meg		33013230	BTS-1Meg	
R96	6800Ω	1	33063340	BTA-6800	
R97	4700Ω	3	33073230	BTS-4700	
R98	3700Ω		33072330	BTS-3700	
R99	37K		33073330	BTS-37K	
R100	10K		33003230	BTS-10K	
R101	100K		33014230	BTS-100K	
R102	4700Ω		33073230	BTS-4700	
R103	150K		33015230	BTS-150K	
R104	680Ω		33063230	BTS-680	
R105	1.2Meg		33025230	BTS-1.2Meg	
R106	470K		33074230	BTS-470K	
R107	18K		33018230	BTS-180K	

Note 1: Not used in some versions.
Note 2: Some versions use 470Ω in this application. (part #33071330)
Note 3: In chassis 3003, 3013, and 3015, .82Ω (WW) is used in this application.

ITEM No	RATING OHMS	WATT	REPLACEMENT DATA CBS-Columbia PART No.	IRC PART No.	NOTES
R108	2.2Meg		33025230	BTS-2.2Meg	
R109	330Ω	1	33033240	BTA-330	
R110	1000Ω	2	33002250	BTB-1000	
R111	1000Ω				
R112	680Ω				
R113	100K		33014230	BTS-100K	
R114	470K		33074230	BTS-470K	
R115	37K	1	33073240	BTS-37K	
R116	3.3Meg		33033230	BTS-3.3Meg	
R117	470K		33074230	BTS-470K	
R118	6800Ω		33063230	BTS-150K	
R119	1500Ω	5%	33013270	BTS-1500 5%	
R120	150K		33015230	BTS-150K	
R121	100K		33014230	BTS-100K	
R122	100K		33014230	BTS-100K	
R123	12K		33023230	BTS-12K	
R124	1000Ω	1	33002240	BTA-1000	
R125	470K		33074230	BTS-470K	
R126	82Ω		33020230	BTS-82	
R127	10K	5	31000S34	PW10-10K	
R128	680K		33064230	BTS-680K	
R129	10K		33003230	BTS-10K	
R130	5000Ω	3	31000S31	PW7-5000	
R131	1.2Ω		33002S30	BTS-1.2	Note 3
R132	1.2Ω		33002S30	BW1-.2	
R133	220K		33034240	BTA-220K	

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	SEC. 1	SEC. 2	SEC. 3	CBS-Columbia PART No	REPLACEMENT DATA Hallderson PART No.	Merit PART No.	Stancor PART No	Thordarson PART No	Triad PART No
T1	117VAC	550VCT	6V	6.3V	10000T91	P-9759 ①	P-2830 ②	P-8334 ③	25R68 ④	R-61BC ⑤
	@1.9A	@ 220A	@ 3A	@ 10A	10000T1 ①					

① Used in chassis 3012, 3013 and 3015.
② Parallel and phase 6.3V, 5A windings, tape 8, 3V, 13A winding.
③ Parallel and phase 6.3V windings.

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	CBS-Columbia PART No.	Hallderson PART No.	Merit PART No.	RCA TYPE No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T2	Horiz. Output Trans.	13001S51		HVO-54*①		A13P4①②	A-8255*①	FLY-76*①	D-68*①
T3	Vert. Output Trans.	10001S69①	21900 ②	A-2823 ③		V30T ③	A-8144 ③	26S73 ③	A-108X ③
T4A T4B	Yoke(90°)Horiz. (23MH) Vert. (99MH)	16001S31 ④	DF60T ⑤	MDF-92 ⑤	23SD1 ⑤	Y90T19/43 ⑤	DY-16A ⑤	Y-16 ⑤	Y-61-1 ⑤

① Drill new mounting hole(s).
② Use 8 1Ω 1/2ww rads.
③ Connect as auto trans.
④ Includes capacitor C105; resistors R111 and R113.
⑤ Use original horiz. yoke damping network.
† This part may be superceded by parts manufacturer's introduction of special unit for this application.

*HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA

Use Original Width Coil Unless Replacement Type Is Listed

ORIGINAL TERMINAL CONNECTIONS	Hallderson Replacement Connections	Merit Replacement Connections	RCA Replacement Connections	Ram Replacement Connections	Stancor Replacement Connections	Thordarson Replacement Connections	Triad Replacement Connections
5	5	5	5	5	5	5	5
4	4	4	4	4	4	4	6
		N.C. See Note ②		N.C. See Note ③	N.C. See Note ②	N.C. See Note ②	N.C. See Note ②
3	3	3	3	3	3	3	4
2	2	2	2	2	2	2	3
1	1	1	1	1	1	1	2
7	7	7	7	7	7	7	1
8	8	8	8	8	8	8	8
Special Notes ①	P	P	P	P	P	P	P

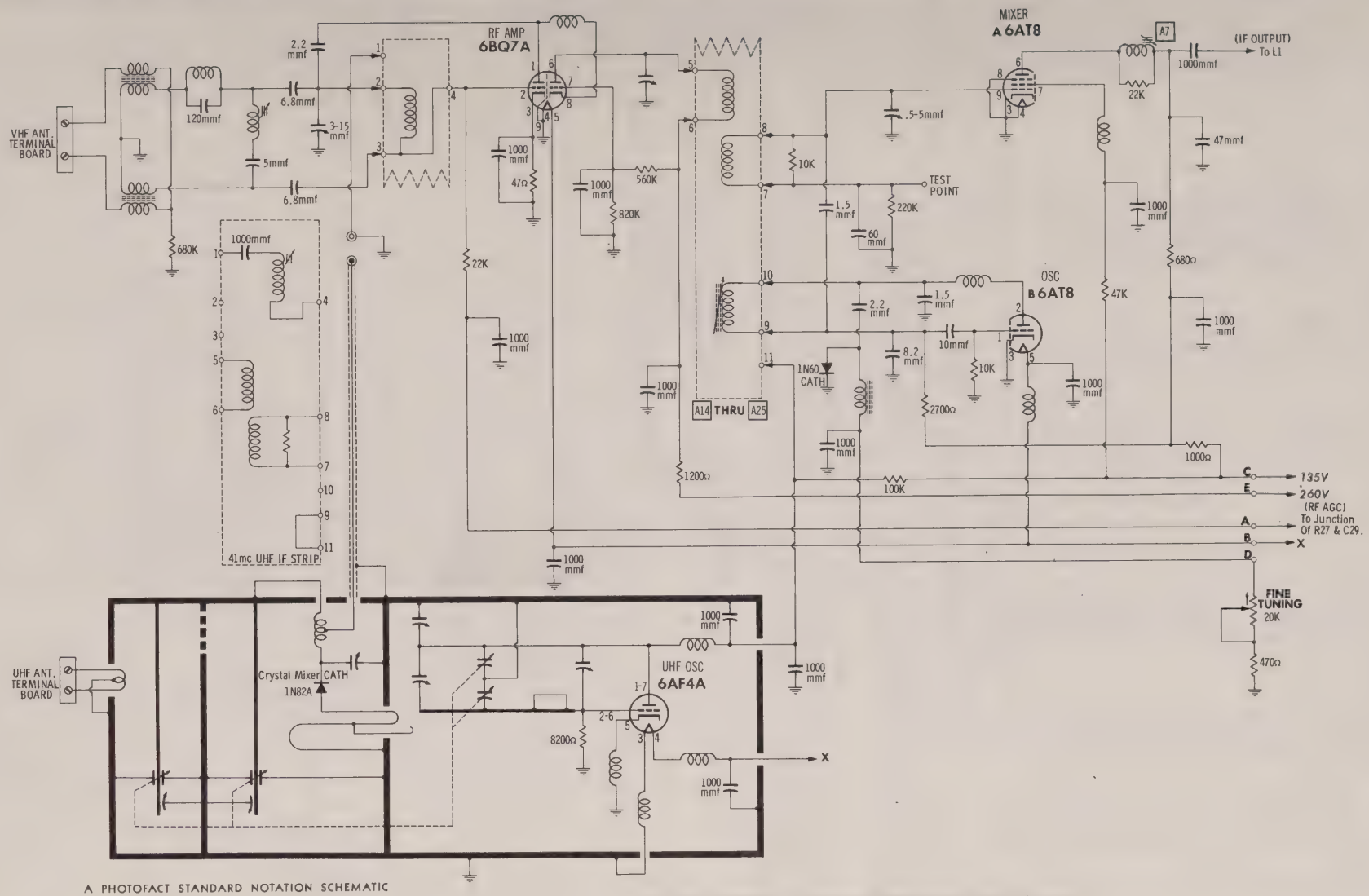
① To reduce yoke "ringing", connect resistor R129 (adjust value if necessary) in series with capacitor C105, across horiz. yoke terms #3 and #7.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	SEC.	CBS-Columbia PART No.	Hallderson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	N.C See Note
T5	4.5K	8-8Ω	10000T01	21002	A-2900	A-3337	28S46	S-53X	

SPEAKER

ITEM No.	RATINGS SIZE	FIELD	V C	IMP	CBS-Columbia PART No.	QUAM PART No.	RCA TYPE No	NOTES
SP1	6"	PM	8-8Ω		6A126 ①			① Used in models TT309, TT310, TT309U, TT310U, TR312, TR312.
	8"					31009981 ②		② Used in models TK335, TK336, TK335U, TK336U, TK339, TK339U, TK333, TK333U, TK334U, TK334.
	10"					32001001 ③		③ Used in models TK335, TK336.
	5"					33001011 ④		④ Used in models TK333, TK334, TK333U, TK334U.
	4"					32001L11 ⑤		⑤ Used in models TT307, TT307U.
								⑥ Used in models TK333U, TK334U, TKR333, TKR334, TKR335, TKR336.



A PHOTOFACT STANDARD NOTATION SCHEMATIC

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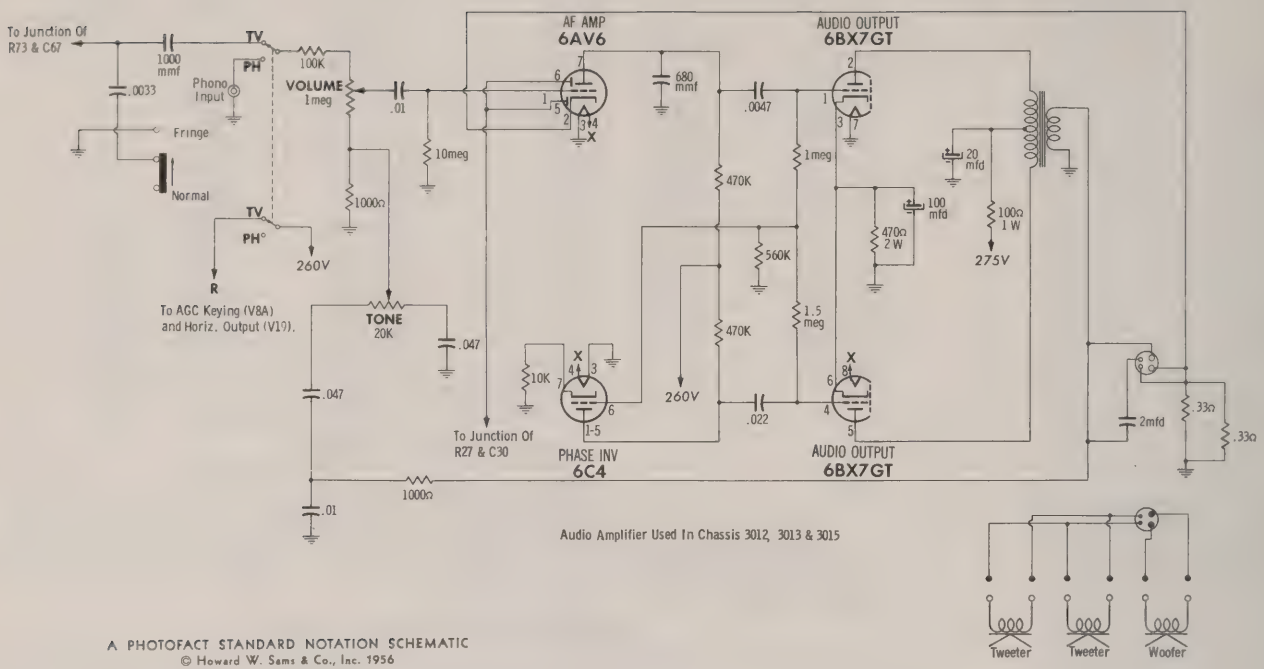
UHF Tuner Part No. 69000851 VHF Tuner Part No. 6900086l Used With Chassis 3002, and 3012.

ALTERNATE UHF-VHF TUNER SCHEMATIC



Audio Amplifier Used In Chassis 3012, 3013 & 3015

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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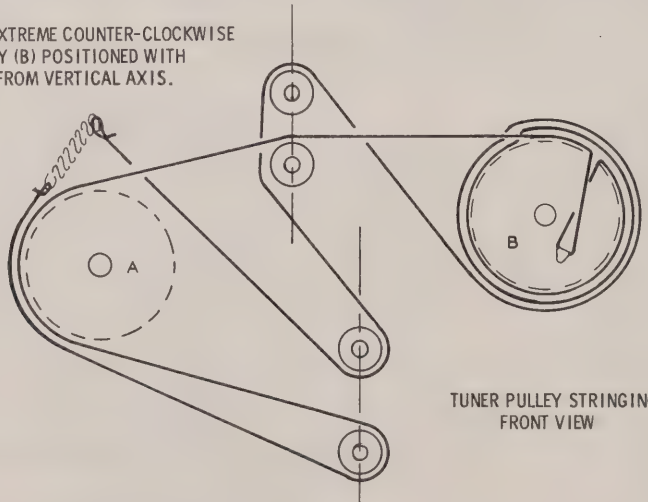
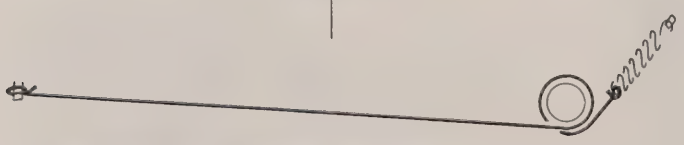
ALTERNATE AUDIO AMP CIRCUIT SCHEMATIC

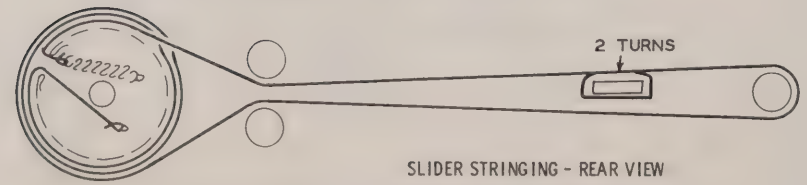
TUNER PULLEY (A) IN EXTREME COUNTER-CLOCKWISE POSITION, AND PULLEY (B) POSITIONED WITH OPENING 45-DEGREES FROM VERTICAL AXIS.



TUNER PULLEY STRINGING - FRONT VIEW



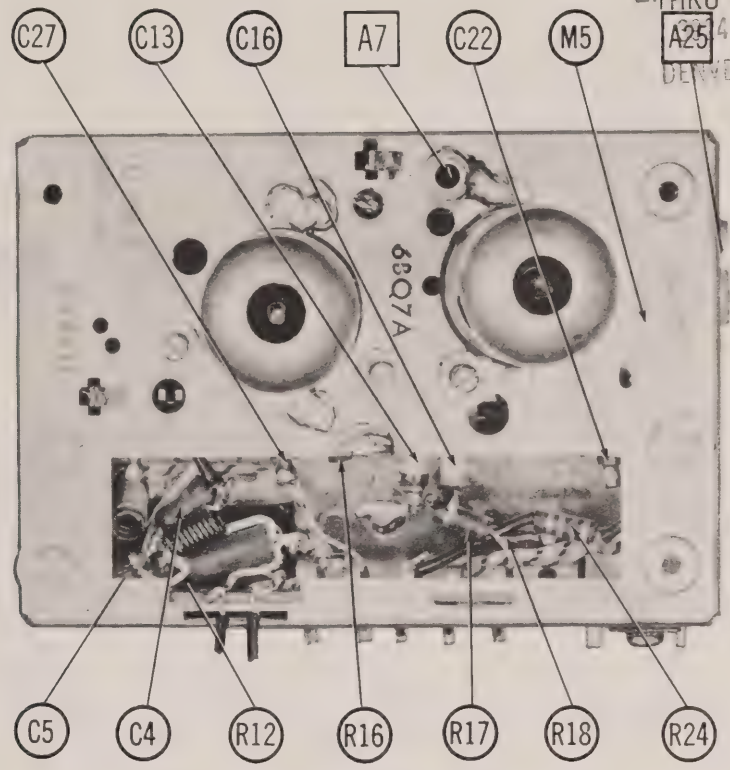
FINE TUNING PULLEY STRINGING - REAR VIEW



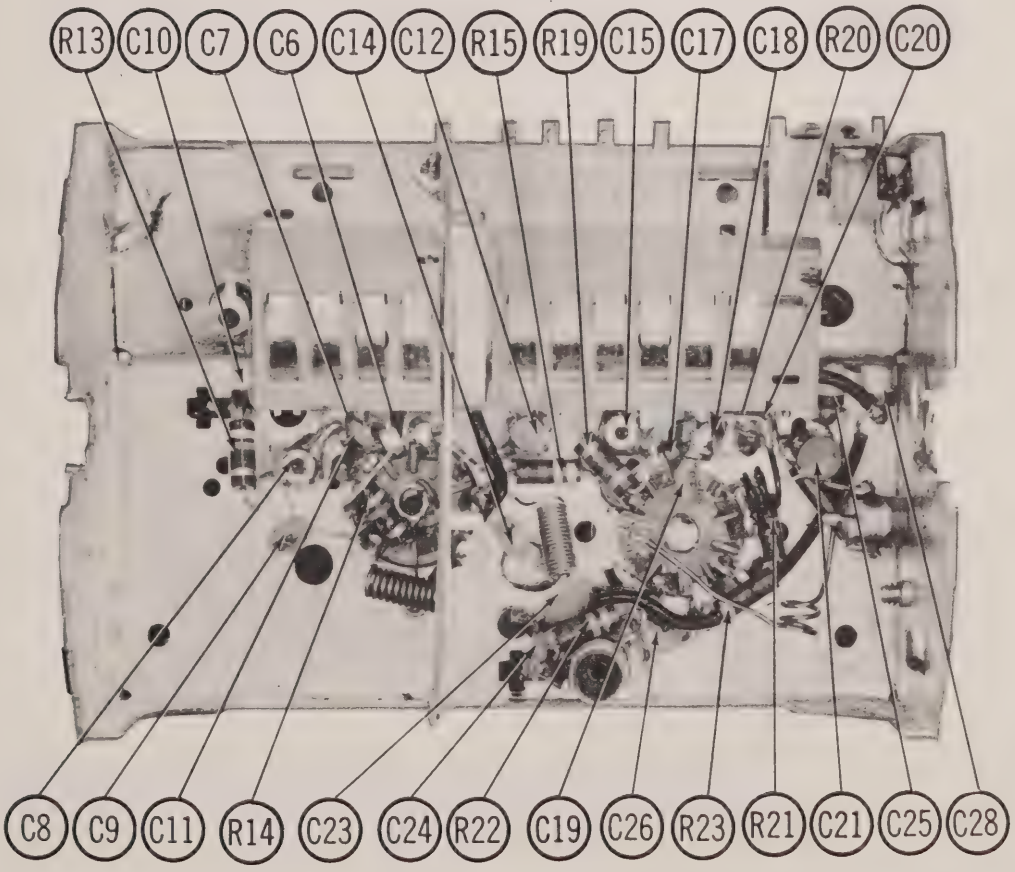
SLIDER STRINGING - REAR VIEW

UHF DRIVE CORD STRINGING

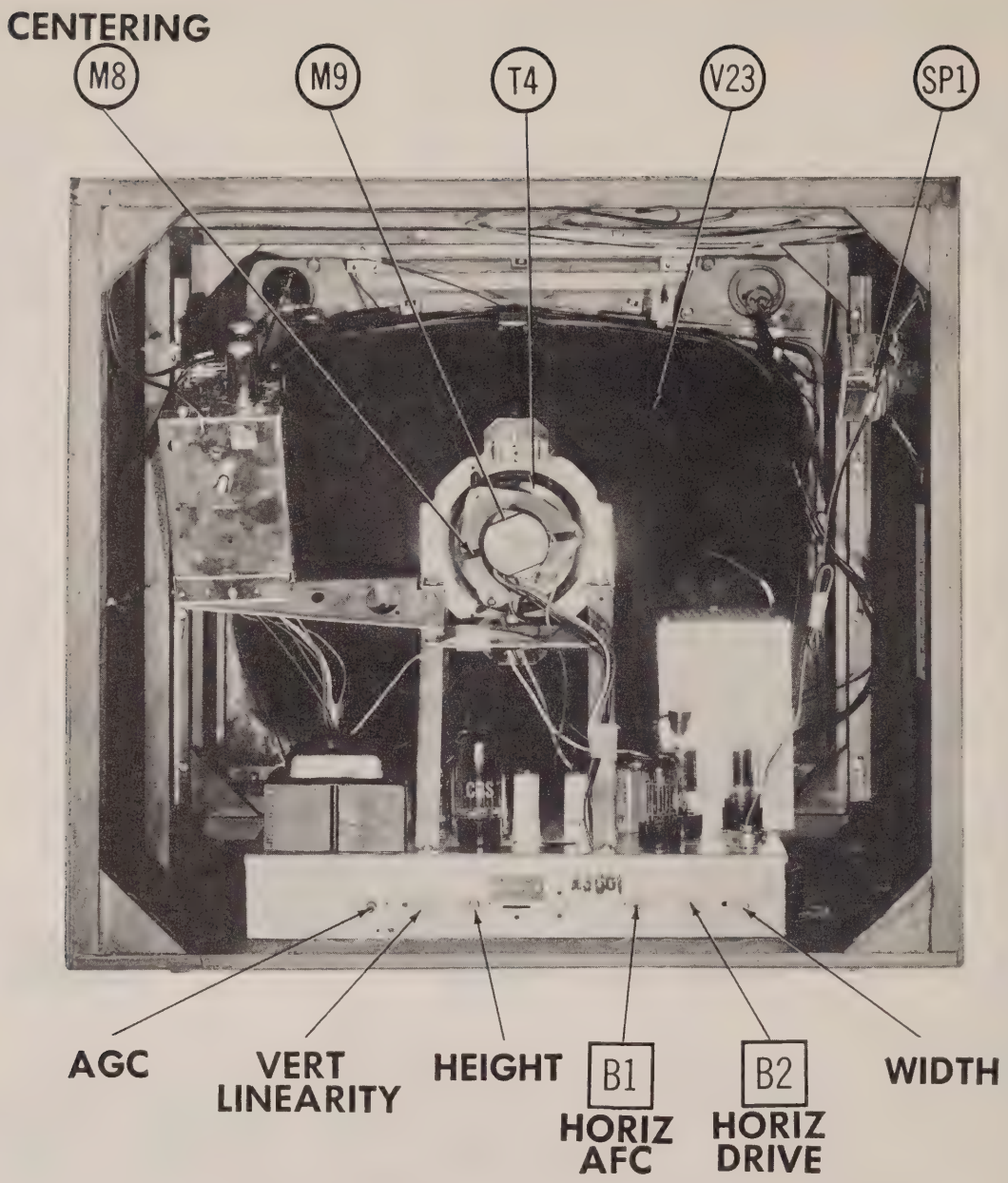
PROPERTY OF
L. THRU ANKENSHIP
2214 MEADE ST.
DENVER, COLORADO



RF TUNER-TOP VIEW



RF TUNER-BOTTOM VIEW



CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

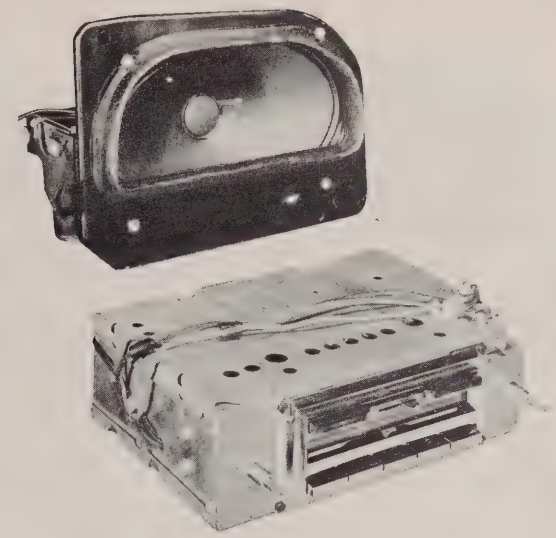
Turn the set on and tune in a TV station, preferably with a test pattern.

Set the horizontal hold control at the center of its range and adjust the AFC coil slug (B1) until the picture synchronizes horizontally.

Set the slug at the center of the range over which the picture remains in sync.

Turn the horizontal drive (B2) counter clockwise as far as possible without the presence of vertical white lines or compression near the center of the picture.

CADILLAC
MODELS 7266505, 7266535



TRADE NAME	Cadillac Models 7266505, 7266535 (For 1956 Cadillac Automobiles)
MANUFACTURER	Delco Radio Div., G. M. Corp., Kokomo, Ind.
TYPE SET	Battery Operated Custom Built AM Superheterodyne Automobile Receiver
TUBES (Eight)	Types 12BA6 RF Amplifier, 12BE6 Converter, 12AU6 IF Amplifier, 12BF6 Det-AVC-AF Amp., (2) 12V6GT Output, 12AU7 Trigger, 0Z4 Rectifier
POWER SUPPLY	12 Volt Storage Battery — RATING 3.8 Amp. @ 12.6 Volts DC
TUNING RANGE—BROADCAST	540KC - 1600KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Turn sensitivity control to MAXIMUM.
Turn tone control to TREBLE.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
	TUNE TO HIGH FREQUENCY END STOP BY PLACING .070" FEELER GAUGE (OR BARE #13 WIRE) IN SLOT AGAINST HIGH FREQUENCY END STOP. PRESS SELECTOR BAR TO ALLOW PLANETARY ARM TO RUN UP AGAINST FEELER GAUGE. TURN RECEIVER OFF AND THEN ON SO THAT DIAL POINTER WILL REMAIN IN SAME POSITION AFTER REMOVAL OF FEELER GAUGE. CAREFULLY REMOVE FEELER GAUGE.						
1.	.1MFD	High side to pin 7 (grid) of 12BE6 (V2). Low side to chassis.	262KC (400∿ Mod)	High frequency end stop.	DC probe to point A. Common to chassis.	A1, A2, A3	Adjust for maximum deflection. Repeat until no further increase is noted.
2.	"	"	"	"	"	A4	Adjust for MINIMUM deflection.
	CHECK OSCILLATOR CORE (A8) SETTING BEFORE ADJUSTING A5, A6 AND A7. MOUNTING END OF COIL FORM TO REAR OF CORE SHOULD BE 1 25/32". CORE ADJUSTMENT, IF NECESSARY, SHOULD BE MADE WITH AN INSULATED SCREWDRIVER FROM MOUNTING END OF COIL.						
3.	68MMF	High side to antenna connector. Low side to chassis.	1615KC	"	"	A5, A6, A7	Adjust in order given for maximum deflection.
4.	"	"	600KC	Tune to 600KC signal.	"	A9, A10	"
5.	"	"	1615KC	Tune to 1615KC signal.	"	A6, A7	"
6.	"	"	1000KC	Tune to 1000KC signal.	"		If necessary, adjust dial pointer adjustment to coincide with 1000KC on dial.
7.	With receiver installed in car and antenna fully extended, tune in a weak station between 600KC and 1000KC and adjust A7 for maximum volume.						

PUSHBUTTON ADJUSTMENTS

1. Open hinged door directly above pushbuttons to expose selector tabs.
2. Tune to desired frequency nearest left end of dial.
3. Move first selector tab from left end till it coincides with dial pointer.
4. Repeat on remaining selector tabs.
5. Check selector tabs by pressing pushbuttons that correspond to selector tabs. If necessary, readjust selector tabs.

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	RF Amplifier	12BA6	
V2	Converter	12BE6	
V3	IF Amplifier	12AU6	
V4	Det.-AVC-AF Amp.	12BF6	
V5	Output	12V6GT	
V6	Output	12V6GT	
V7	Trigger	12AU7	
V8	Rectifier	0Z4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA DELCO PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	■2	400	6322	AFH3-120	C099	FP345.8	TMT-106	T-550	TVL-3678
B	▲20	400							
C	20	25							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA DELCO PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C2	.05	200	6512	BPD-05	DF-503	CUB2S5		PT415	2TM-S5	
C3	.05	200	6512	BPD-05	DF-503	CUB2S5		PT415	2TM-S5	
C4A	68		6369	NP0-DI68	TCZ-68	Z038	NP0-337-680		5TCC-Q68	Note 1
B	39		6366	NP0-DI39	TCZ-39	Z031	NP0L-390		5TCC-Q39	Note 1
C5	250		7266596							
C6	.1	400	6513	P488N-1	DF-104	CUB4P1		PT401	4TM-P1	
C7	330		6377	1469-00033	D6-331	5R5T33	811-331	UC-5333	MS-333	Note 2
C8	100	500	1219498	NP0-SI100	TCZ-100	22R5T1	NP0-337-101	MCE235	MS-31	
C9	100	500	1219498	NP0-SI100	TCZ-100	22R5T1	NP0-337-101	MCE235	MS-31	
C10	100	500	6371	NP0-SI100	TCZ-100	22R5T1	NP0-337-101	MCE235	MS-31	
C11	.002	600	6528	DI-002	DD-202	CUB6D2	GP2-333-202	PT622	6TM-D2	
C12	.005	600	6531	BPD-005	DD-502	CUB6D5	GP2-333-502	PT625	6TM-D5	
C13	.01	400	6354	BPD-01	D6-103	CUB4S1	GP3-333-103	PT411	4TM-S1	
C14	.2	400	6514	P488N-22		CUB4P22		PT402	4TM-P2	
C15	.025	400	1211232	P488N-025		CUB4S22		PT4122	4TM-S25	
C16	100		6371	NP0-DI100	TCZ-100	TZ30	NP0-337-101	ZT-531	5TCC-T1	
C17	.004	800	6564	P1088N-004	DD16-402	CUB16D4		PT1624	10TM-D4	
C18	2000		6352	BPD-002	DD-202	K072	801-002	DC-522	5HK-D2	
C19	.007	1600	6567	P1688N-007	DD16-702	CUB16D7		PT1627	MB-D7	
C20	.47	100	6592	VHC36		ST2P5		RF480	68P20	
C21	.47	100	6592	VHC36		ST2P5		RF480	68P20	
C22	.47	100	6592	VHC36		ST2P5		RF480	68P20	

Note 1. May be replaced with individual units : C4A part #6369, C4B part #6366.
Note 2. Not used in some versions.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA DELCO PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	Switch		7266982					Tone (Panel)
B	1.5Meg	½						Volume (Rear) Tap@ 275K
C	Switch							Power On-Off
R2	40Ω	2	7266980					Fader, Wire Wound (Note 1)

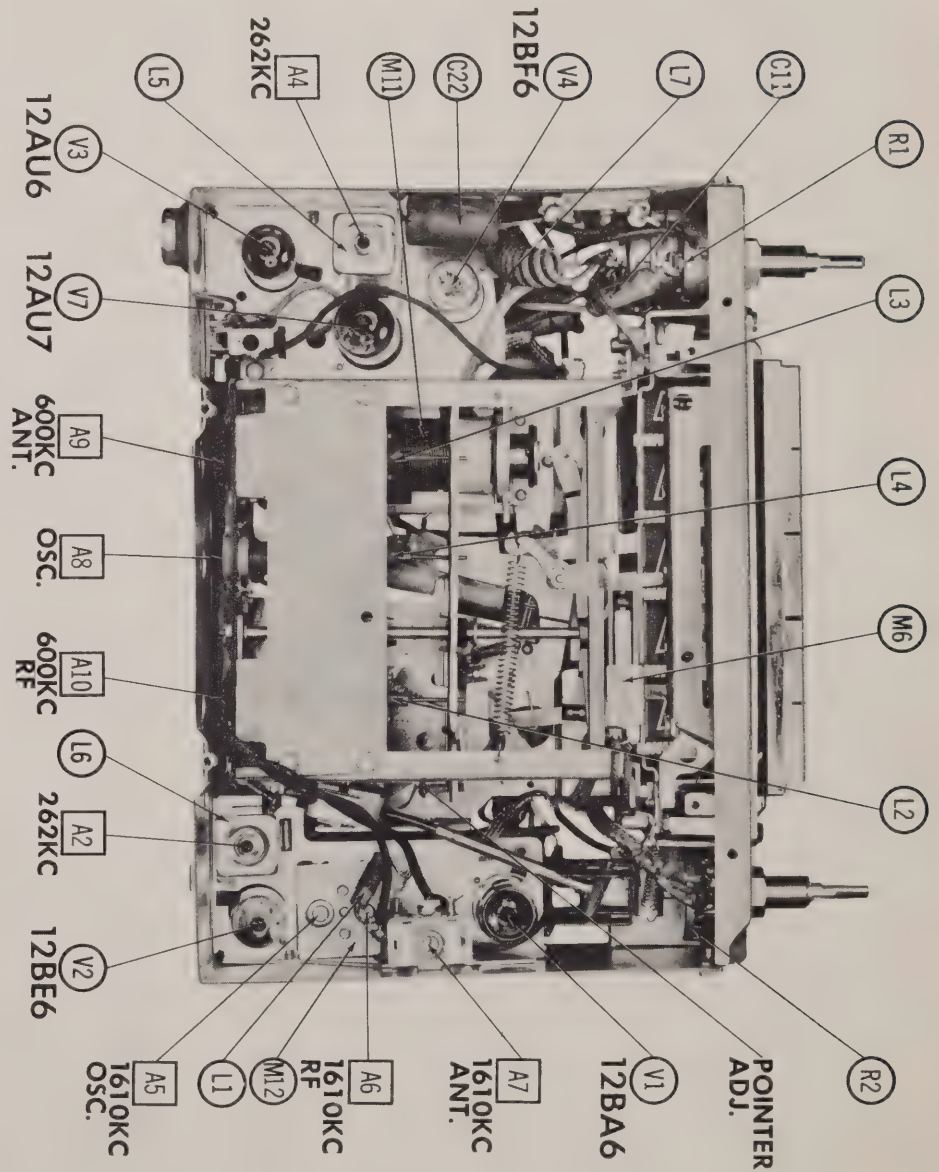
Note 1: Used in model 7266505 only.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA DELCO PART No.	IRC PART No.	NOTES
R3	2.2Meg		1239	BTS-2.2Meg	
R4	15K	1	1253	BTA-15K	
R5	1Meg		1235	BTS-1Meg	
R6	100Ω		1113	BTS-100	
R7	1.5Meg		1237	BTS-1.5Meg	
R8	330K		1229	BTS-330K	
R9	100Ω		1113	BTS-100	
R10	22K		1215	BTS-22K	
R11	12K	2	1276	BTB-12K	
R12	10Ω		1101	BTS-10	
R13	150Ω			BTS-150	Note 1
R14	82K	1	1222	BTA-82K	Note 2
R15	680K 5%		1233	BTS-680K 5%	Note 2
R16	390K 5%			BTS-390K 5%	Note 2
R17	1Meg		1235	BTS-1Meg	
R18	1.5Meg 5%		1219492	BTS-1.5Meg 5%	

TUNER CHASSIS - TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS (cont)

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	DELCO PART No.	IRC PART No.	
R19	100K			BTS-100K	Note 3
R20	100K		1223	BTS-100K	
R21	680K		1233	BTS-680K	
R22	1Meg		1275	BTS-1Meg	
R23	47K	1	1259	BTA-47K	
R24	1000Ω 5%		1125	BTS-1000 5%	
R25	3300Ω 5%		1220173	BTS-3300 5%	
R26	3900Ω		1132	BTS-3900	
R27	12K		1212	BTS-12K	
R28	360Ω 5%	1	7234563	BW1-360 5%	
R29	1000Ω		1220176	BTS-1000	
R30	47K		1215	BTS-47K	Note 4
R31	120K		1224	BTS-120K	
R32	47K	1	1220188	BTA-47K	
R33	5.6Meg		1244	BTS-5.6Meg	
R34	330K		1229	BTS-330K	Note 2
R35	220K		1227	BTS-220K	Note 2
R36	820Ω 5%			BTS-820 5%	Note 5
R37	6800Ω 5%	1	7266367	BTA-6800 5%	
R38	47K 5%	1	1259	BTA-47K 5%	
R39	12K	1	1252	BTA-12K	
R40	1800Ω	7			Note 6
R41	15K	1	1253	BTA-15K	

Note 1: Some versions use 270Ω in this application. (Part #1118)
Note 2: Not used in some versions.
Note 3: Some versions use 47K in this application. (Part #1219)
Note 4: Some versions use 22K in this application. (Part #1215)
Note 5: Some versions use 910Ω 5% or 1000Ω in this application.
Note 6: Mfgr. states to replace with 2700Ω 2W (part #1204) and 5600Ω 1W (part #1171) wired in parallel. (IRC #BW2-2700 & BTA-5600).

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	DELCO PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	12.6VCT @ 1.1A	550VCT @ .07IA			6067	V3902	P-2861	P-6489	22R52	V-31

TRANSFORMER (INPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	DELCO PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	1800Ω CT		1220902						

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	DELCO PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T3	8700Ω	3-4Ω	7266997	Z1011 ①	A-2901 ①	A-3870①	22S56 ①	S-55X①	① Use original channel

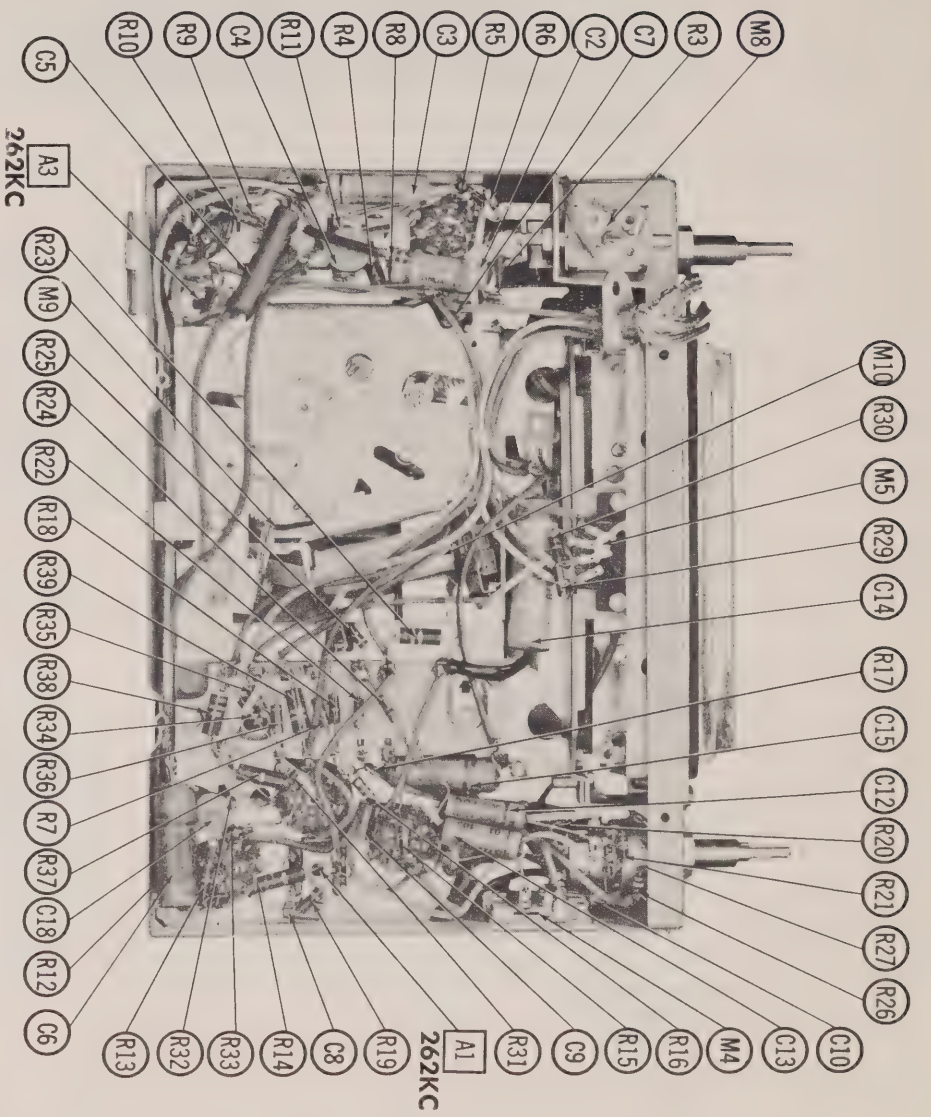
SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	DELCO PART No.	QUAM PART No.	RCA TYPE No.	
SP1	6" x 9"	PM	3-4Ω	7267065 ①	69A3	23881	① Front speaker
SP2	6" x 9"	PM	3-4Ω	7262245 ②	69A3	23881	② Rear speaker

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	DELCO PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Ant. Coupling Coil	.8Ω		7255738	19-1005		4612	9 Microhenries
L2	Ant. Coil	10Ω		7257979				
L3	RF Coil	10Ω		7257979				
L4	Osc. Coil	.9Ω	4.2Ω	7263287				
L5	Input IF	42Ω	42Ω	1219508	16-6752	BC-350	12-H1	
L6	Output IF	32Ω	32Ω	1220204				
L7	Fil. Choke	0Ω		1217846				1.4 Microhenries
L8	Fil. Choke	0Ω						1.4 Microhenries
L9	RF Choke	0Ω						1.4 Microhenries
L10	Vib. Hash Choke	.1Ω		7265389				42 Microhenries

TUNER CHASSIS - BOTTOM VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

VIBRATOR

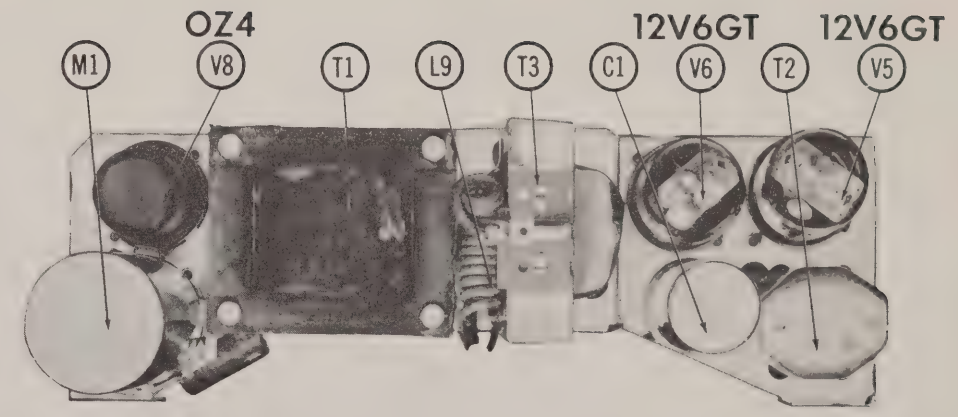
ITEM No.	TYPE	INPUT VOLTS	FREQUENCY	REPLACEMENT DATA				NOTES
				DELCO PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	RADIART PART No.	
M1	Interrupter	12. 6V	115v	8555	6330	883	6330	

FUSES

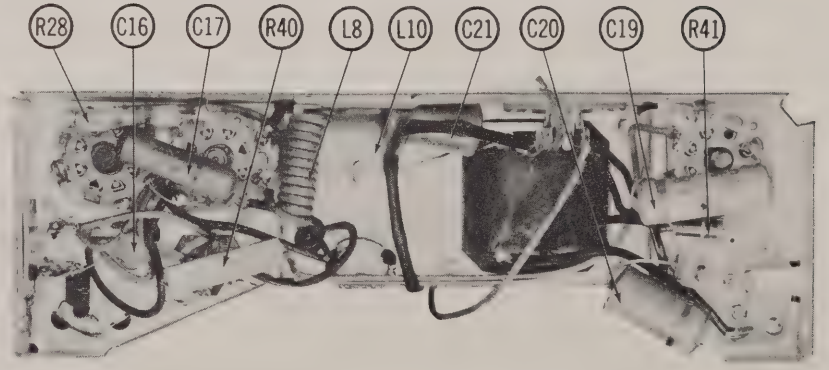
ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			DELCO PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M2		7. 5A	455640					

MISCELLANEOUS

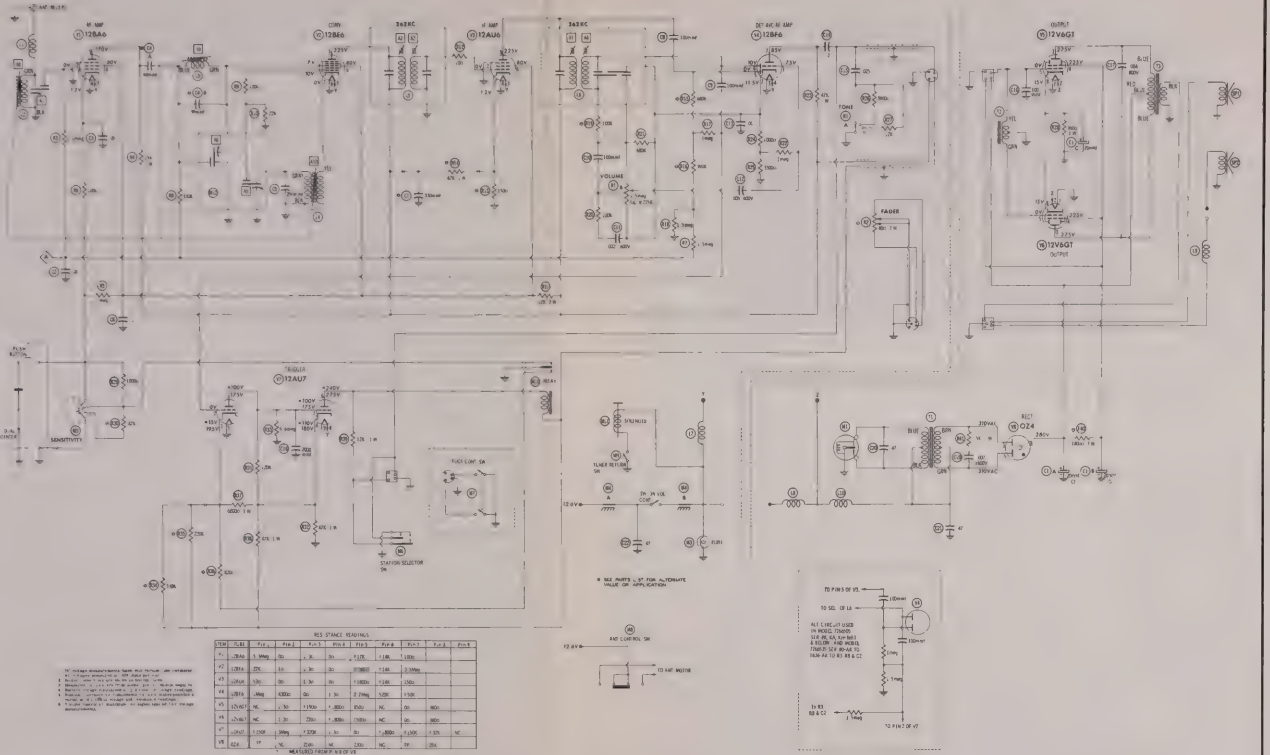
ITEM No.	PART NAME	DELCO PART No.	NOTES
M3	Pilot Light		"On" Indicator #1891
M4A	Spark Plate	1220308	
B	Spark Plate		
M5	Switch	7266978	Sensitivity (SP-3 Position, Rotary, wafer type)
M6	Switch	7265300	Station Selector
M7	Switch	7258903	Station Selector (Foot control)
M8	Switch	1220876	Ant. Control (SPDT-Slide Type)
M9	Switch	7263340	Tuner Return
M10	Relay	1220326	
M11	Solenoid	1220685	
M12	Trimmer Cap.	7242454	Dual: Osc. (A5) & RF (A6)
A7	Trimmer Cap.	7266240	Antenna
	Knob	1463300	On-off-volume & tuning
	Knob	1463301	Tone & fader
	Pushbutton & Slide Assy.	7263658	5 used
	Pushbutton	1220330	#1 (Left to right)
	Pushbutton	1220331	#2 (Left to right)
	Pushbutton	1220332	#3 (Left to right)
	Pushbutton	1220333	#4 (Left to right)
	Pushbutton	1220334	#5 (Left to right)
	Dial	7266808	
	Tab Rail Board	7263916	
	Indicator	1220192	Selector Tab (Set of 5)
	Contact	1220193	Button Slide (Set of 5)
	Contact	1220191	Selector Tab (Set of 5)



POWER CHASSIS - TOP VIEW



POWER CHASSIS - BOTTOM VIEW



RESISTANCE READINGS

ITEM	TO B+	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	1.2MEG	3.9MEG	0Ω	1.3Ω	3Ω	1.1Ω	1.1KΩ	2.1KΩ		
V2	1.2MEG	270K	0Ω	1.3Ω	3Ω	270KΩ	1.1KΩ	2.1KΩ		
V3	1.2MEG	4.5KΩ	0Ω	3.7Ω	3Ω	1.1KΩ	1.1KΩ	2.2KΩ		
V4	1.2MEG	4MEG	430Ω	0Ω	1.3Ω	2.2MEG	5.2KΩ	1.5KΩ		
V5	1.2MEG*	NC	1.3Ω	1.1KΩ	1.3KΩ	1KΩ	NC	0Ω	360Ω	
V6	1.2MEG*	NC	1.3Ω	720Ω	1.3KΩ	1KΩ	NC	0Ω	360Ω	
V7	1.2MEG*	1.1MEG	56MEG	1.32M	1.3Ω	0Ω	1.3KΩ	1.1KΩ	1.5%	NC
V8	424	TP	VAC	254V	VAC	230Ω	NC	TP	254	

* MEASURED FROM R1 OF V8
NC NO CONNECTION
TP T C POINT
* MEASURED IN SEARCH NE POSITION

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PROPERTY OF
L. F. BLANKENSHIP
3924 MADE ST.
DENVER, COLORADO

ELECTRO-VOICE
MODEL PC1

ELECTRO-VOICE
MODEL PC1

TRADE NAME	Electro-Voice Model PC1
MANUFACTURER	Electro-Voice, Inc., Buchanan, Michigan
TYPE SET	AC Operated Equalizer Preamplifier
TUBES (Four)	Types 12AX7 Preamplifier, 12AT7 AF Amplifier, 12AX7 AF Amplifier-Cathode Follower, 6X4 Rectifier
POWER SUPPLY	105-125 Volts AC-60 Cycles RATING .22 Amp. @ 117 Volts AC

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Preamplifier	12AX7	
V2	AF Amplifier	12AT7	
V3	AF Amp.-Cathode Follower	12AX7	
V4	Rectifier	6X4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	Electro-Voice PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	▲40	350	4299					T-110	R2287 *
B	▲40	350						MT-4530	
C	20	350							
D	■40	350							

* Non-catalog item.

FIXED CAPACITORS

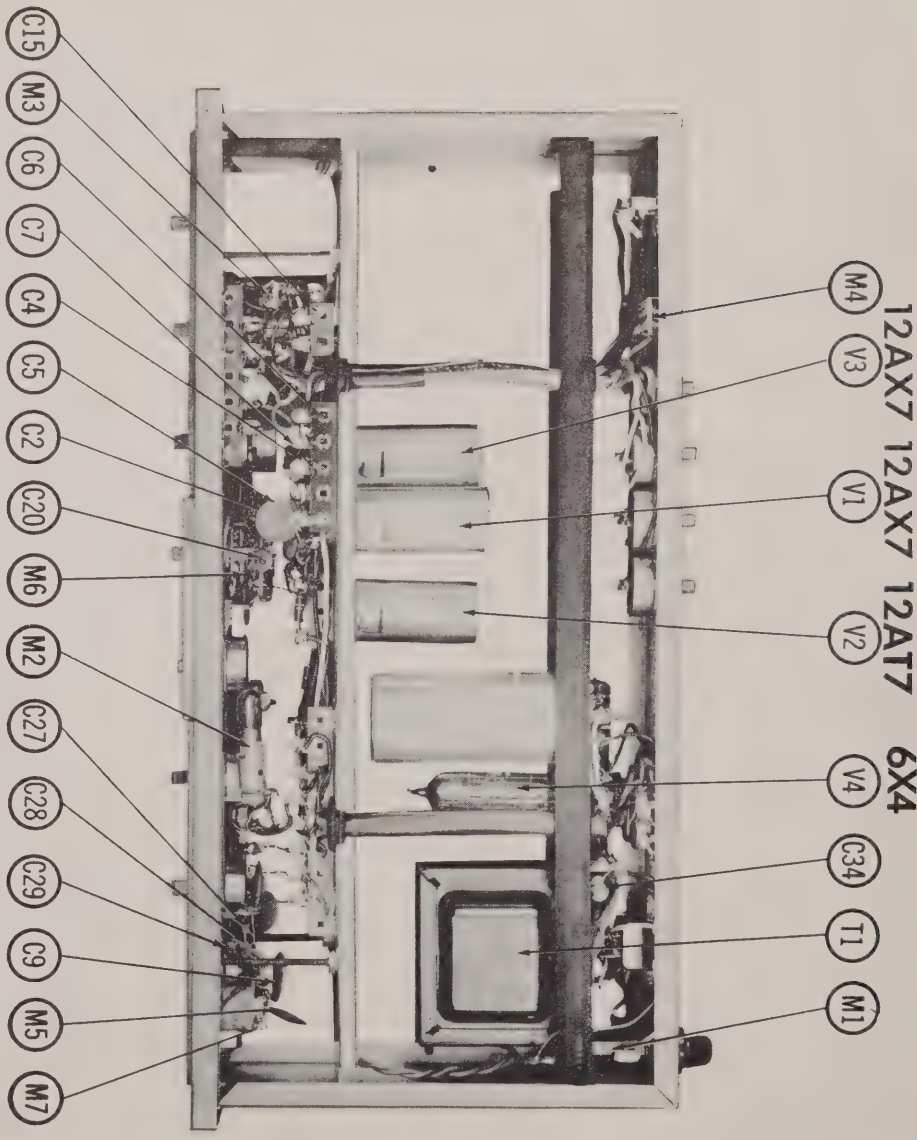
Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	Electro-Voice PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C2	10000		4252	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C3	2000		4259	BPD-002	DD-202	K072	801-002	DC-522	5HK-D2	
C4	.0047	400	4261	BPD-0047	D6-472	CUB6D47	GP2-333-472	PT6247	6TM-D47	
C5	10000		4252	BPD-01	DD-103	K082	811-01	DC-511	5HK-D1	
C6	10000		4252	BPD-01	DD-103	K082	811-01	DC-511	5HK-D1	
C7	10		4212	SH0	D6-100	TP09	GPIK-100	UC-541	5GA-Q1	
C8	.047	400	4243	BPD-05	DF-503	CUB4S47		PT4147	4TM-S47	
C9	10000		4257	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C10	5000		42002	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C11	800		4253	BPD-0008	DD-801	K067	811-821	MC251	5GA-T8	
C12	10000		4252	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C13	8200		42001	1467-0082		IDR3D82		MC451	1FM-282	
C14	.1	400	4245	P488N-1	DF-104	CUB4P1		PT401	4TM-P1	
C15	1000		4258	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C16	500		42003	BPD-0005	DD-501	K061	811-501	UC-535	5GA-T5	
C17	10000		4257	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C18	500		42003	BPD-0005	DD-501	K061	811-501	UC-535	5GA-T5	
C19	800		4253	BPD-0008	DD-801	K067	811-821	MC251	5GA-T8	
C20	270		4255	BPD-00027	DD-271	G054	811-271	UC-5327	5GA-T27	
C21	.0068	400	4262	BPD-0068	D6-682	CUB6D68	GP3-333-682	PT6268	6TM-D68	
C22	1000		4258	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C23	10000		4257	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C24	200		4256	BPD-0002	DD-201	G050	811-201	UC-532	5GA-T2	
C25	2000		4259	BPD-002	DD-202	K072	801-002	DC-522	5HK-D2	
C26	.1	400	4245	P488N-1	DF-104	CUB4P1		PT401	4TM-P1	
C27	500		42003	BPD-0005	DD-501	K061	811-501	UC-535	5GA-T5	
C28	1500		4254	BPD-0015	DD-152	K071	801-0015	DC-5215	5HK-D15	
C29	270		4255	BPD-00027	DD-271	G054	811-271	UC-5327	5GA-T27	
C30	.1	200	4265	P288N-1	DF-104	CUB2P1		PT401	2TM-P1	
C31	.1	200	4265	P288N-1	DF-104	CUB2P1		PT401	2TM-P1	
C32	.1	200	4265	P288N-1	DF-104	CUB2P1		PT401	2TM-P1	
C33	.047	400	4243	BPD-05	DF-503	CUB4S47		PT4147	4TM-S47	
C34	.047	400	4243	BPD-05	DF-503	CUB4S47		PT4147	4TM-S47	

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	Electro-Voice PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	50K	½	N4686			Q11-123	UF54L	Volume (Panel)
B	250K	½				M13-130	UR-254A	Volume (Rear)
C	Shaft						DS-36	Attach to R1A
R2A	25K	½	P4686	B-27	A47-25K-V	Q14-120	U28	Presence
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	Attach to R2A
R3A	1Meg	½	Q4686	B-70	A47-1Meg-Z	Q13-137	U53	Treble
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	Attach to R3A
R4A	1Meg	½	Q4686	B-70	A47-1Meg-Z	Q13-137	U53	Bass
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	Attach to R4A
R5A	500Ω	½	R4686	AB-4	A47-500-S	Q11-103	U2	Ceramic phono hum
B	Shaft			AK-1	FKS-1/4	Not Req.	Not Req.	Attach to R5A
R6A	500Ω	½	R4686	AB-4	A47-500-S	Q11-103	U2	Magnetic phono hum
B	Shaft			AK-1	FKS-1/4	Not Req.	Not Req.	Attach to R6A
R7A	500K	½	G-4686	AB-60	A47-500K-Z	Q13-133	U48	Tuner Level
B	Shaft			AK-1	FKS-1/4	SQ	Not Req.	Attach to R7A

CHASSIS CAPACITOR IDENT.



PARTS LIST AND DESCRIPTIONS (Continued)

CONTROLS (cont)

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	Electro-Voice PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R8A	500K	½	G-4686	AB-60	A47-500K-Z	Q13-133	U48	Tape level
B	Shaft			AK-1	FKS-1/4	SQ	Not Req.	Attach to R8A
R9A	500K	½	G-4686	AB-60	A47-500K-Z	Q13-133	U48	TV Level
B	Shaft			AK-1	FKS-1/4	SQ	Not Req.	Attach to R9A
R10A	500K	½	G-4686	AB-60	A47-500K-Z	Q13-133	U48	Aux. level
B	Shaft			AK-1	FKS-1/4	SQ	Not Req.	Attach to R10A

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	Electro-Voice PART No.	IRC PART No.	
R11	22Meg		4606	BTS-22Meg	
R12	47K		4668	BTS-47K	
R13	120K		4670	BTS-120K	
R14	2200Ω		4676	BTS-2200	
R15	12Meg		4672	BTS-12Meg	
R16	120K		4670	BTS-120K	
R17	1.2Meg		4656	BTS-1.2Meg	Note 1
R18	120K		4670	BTS-120K	
R19	68K		46019	BTS-68K	
R20	2.2Meg		46025	BTS-2.2Meg	
R21	390K		46028	BTS-390K	
R22	330K		4685	BTS-330K	
R23	390K		46028	BTS-390K	
R24	330Ω			BTS-330	Note 1
R25	1.8Meg		4673	BTS-1.8Meg	
R26	27K		4651	BTS-27K	
R27	1200Ω		4658	BTS-1200	
R28	4700Ω		4675	BTS-4700	
R29	39K		4697	BTS-39K	
R30	470K		4650	BTS-470K	
R31	1200Ω		4658	BTS-1200	
R32	12K		4649	BTS-12K	
R33	33K		4665	BTS-33K	
R34	820K		46027	BTS-820K	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	Electro-Voice PART No.	IRC PART No.	
R35	220K		46024	BTS-220K	
R36	4.7Meg		46026	BTS-4.7Meg	
R37	820K		46027	BTS-820K	
R38	470K		4650	BTS-470K	
R39	82K		4696	BTS-82K	
R40	68K		46019	BTS-68K	
R41	47K		4668	BTS-47K	
R42	39K		4697	BTS-39K	
R43	22K		4678	BTS-22K	
R44	27K		4651	BTS-27K	
R45	1.2Meg		4656	BTS-1.2Meg	
R46	150K		4603	BTS-150K	
R47	120K		4670	BTS-120K	
R48	12K		4649	BTS-12K	
R49	120K		4670	BTS-120K	
R50	120K		4670	BTS-120K	
R51	1800Ω		4677	BTS-1800	
R52	470Ω		4654	BTS-470	
R53	470K		4650	BTS-470K	
R54	47K		4668	BTS-47K	
R55	1.2Meg		4656	BTS-1.2Meg	
R56	33K		4665	BTS-33K	
R57	1.2Meg		4656	BTS-1.2Meg	
R58	120K		4670	BTS-120K	

Note 1. Not used in some versions.

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	Electro-Voice PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117VAC @.22A	550VCT @.010A	5VAC @.6A	6.3VAC @1.2A	1595					

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	Electro-Voice PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	RF Choke	750Ω		1596				176 Microhenries
L2	RF Choke	750Ω		1596				176 Microhenries

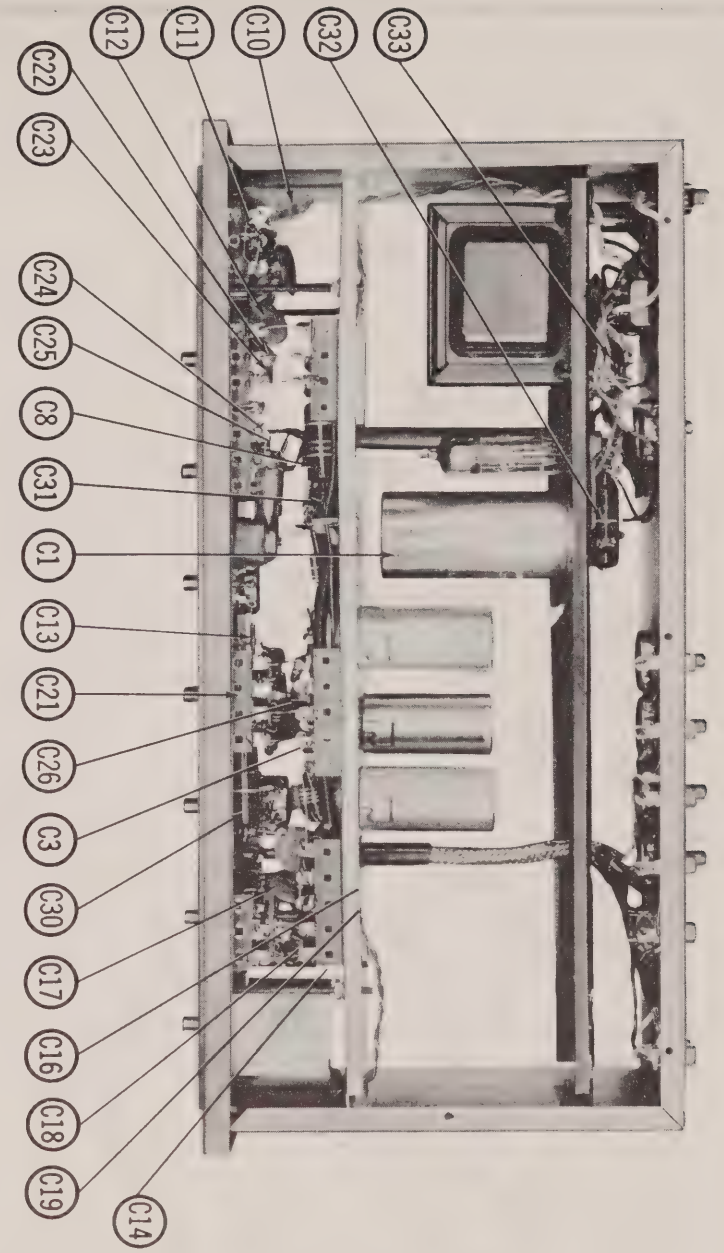
FUSES

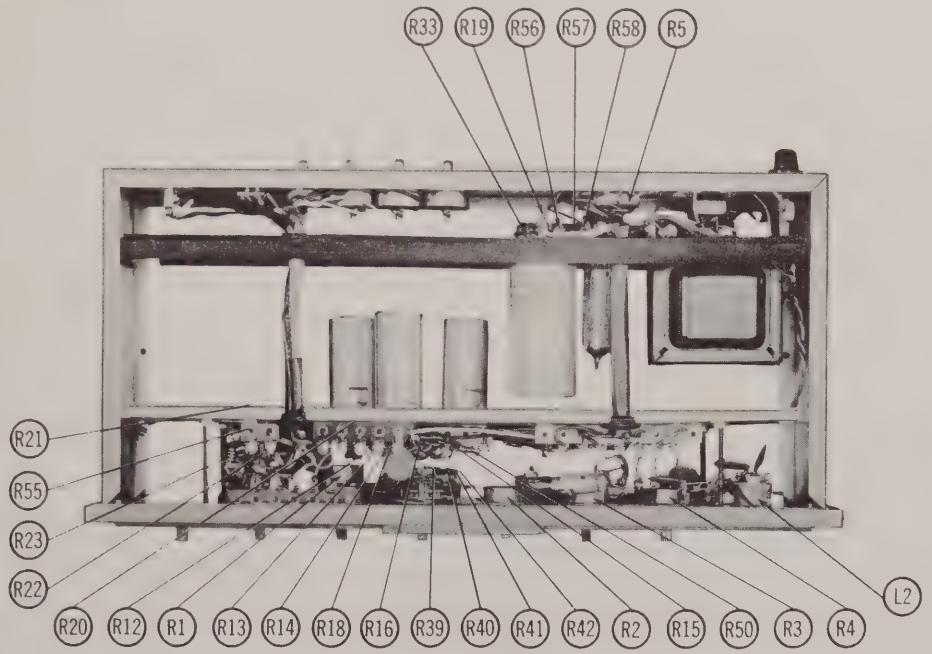
ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			Electro-Voice PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M1	3AG	½A 250V	20066		312.500 (3AG - ½A)	342001	AGC 1/2	HKP

MISCELLANEOUS

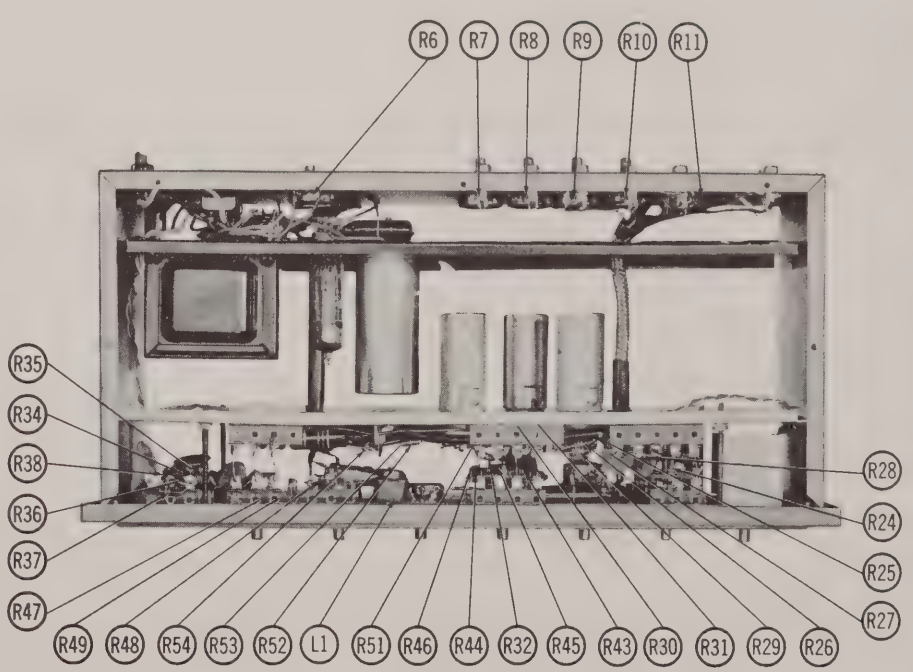
ITEM No.	PART NAME	Electro-Voice PART No.	NOTES
M2	Pilot Light	4318	#47
M3	Switch		Selector & Record Compensator (Rotary, wafer type)
M4	Switch		Phono (Magnetic-ceramic) DPDT slide type)
M5	Switch		Bass cut (3 position - slide type)
M6	Switch		Loudness (SP-6 position; rotary, wafer type)
M7	Switch		High cut (3 position - slide type)

CHASSIS CAPACITOR IDENT.

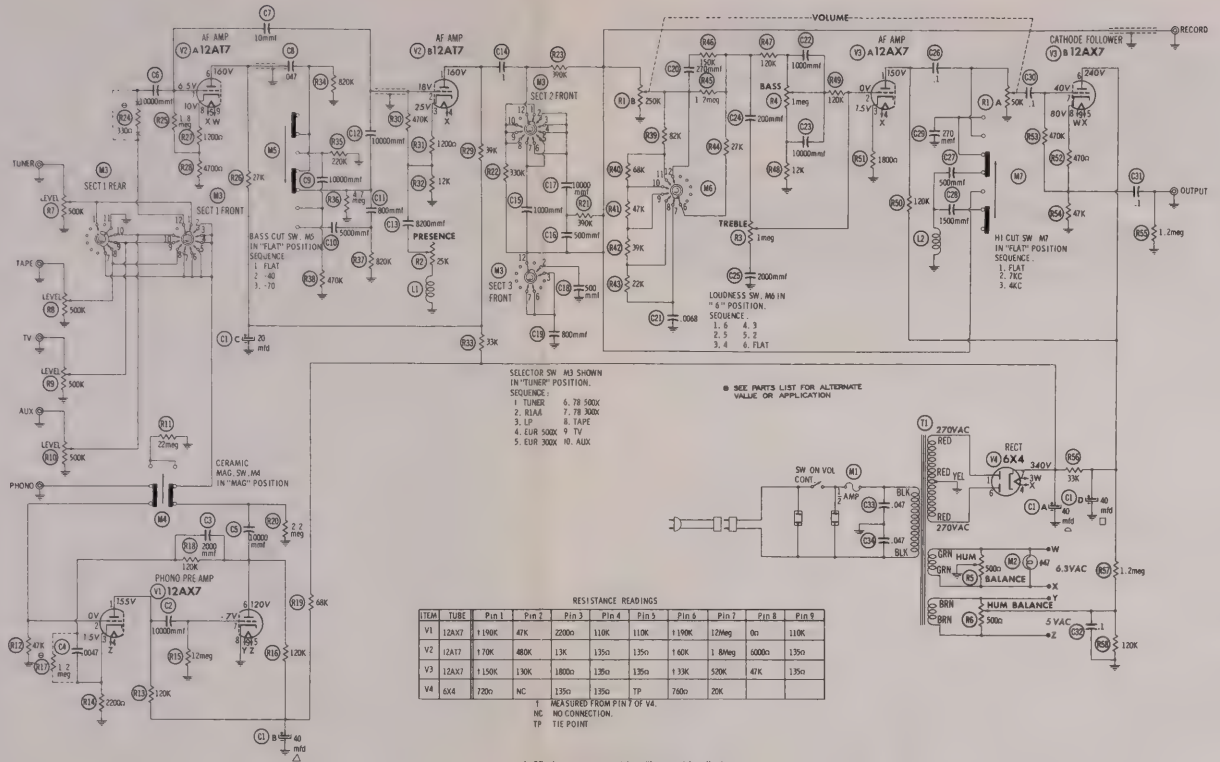




CHASSIS-RESISTOR IDENT.



CHASSIS-RESISTOR IDENT.


AF AMP V2 12AT7
AF AMP V2 12AT7
AF AMP V3 12AX7
CATHODE FOLLOWER V3 12AX7
VOLUME
RECORD
OUTPUT
TUNER
TAPE
TV
AUX
PHONO
SECT 1 REAR
SECT 1 FRONT
SECT 2 FRONT
SECT 3 FRONT
BASS CUT SW. M5 IN "FLAT" POSITION SEQUENCE: 1. FLAT 2. -40 3. -70
PRESENCE
BASS
TREBLE
LOUDNESS SW. M6 IN "6" POSITION. SEQUENCE: 1. 6 4. 3 2. 5 5. 2 3. 4 6. FLAT
HI CUT SW. M7 IN "FLAT" POSITION SEQUENCE: 1. FLAT 2. 7KC 3. 4KC
SELECTOR SW. M3 SHOWN IN "TUNER" POSITION. SEQUENCE: 1 TUNER 6. 78 500X 2. RIAA 7. 78 300X 3. LP 8. TAPE 4. EUR 500X 9 TV 5. EUR 300X 10. AUX
CERAMIC MAG. SW. M4 IN "MAG" POSITION
PHONO PRE-AMP V1 12AX7
SW ON VOL CONT
RECT V4 6X4
270VAC
6.3VAC
5 VAC
HUM BALANCE
BALANCE
SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	12AX7	†190K	47K	2200Ω	110K	110K	†190K	12Meg	0Ω	110K
V2	12AT7	†70K	480K	13K	135Ω	135Ω	†60K	1.8Meg	6000Ω	135Ω
V3	12AX7	†150K	130K	1800Ω	135Ω	135Ω	†33K	520K	47K	135Ω
V4	6X4	720Ω	NC	135Ω	135Ω	TP	760Ω	20K		

† MEASURED FROM PIN 7 OF V4.
NC NO CONNECTION.
TP TIE POINT

1. DC voltage measurements taken with vacuum tube voltmeter, AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings
6. All controls at minimum.

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L. F. [illegible]
3524 [illegible] ST.
DENVER, COLORADO

GARRARD
MODELS RC88, RC98

GARRARD
MODELS RC88, RC98

GENERAL INFORMATION

The Garrard Models RC-98 and RC-88 Record Changers are designed to play standard 78 RPM, fine-groove 45 RPM, or micro-groove 33 1/3 RPM records of standard commercial dimensions. Records up to 12 inches in diameter can be played.

Features of Models RC-98 and RC-88 Changers include playing and automatically changing as many as eight records, 10" or 12", not mixed. A full stack of eight 7", 33 1/3 RPM records or a full stack of eight 7", 45 RPM records (using the "45" Adaptor Spindle) will also play on this changer.

A short spindle for use when playing small hole records manually and an adaptor for playing large hole 45 RPM records manually is supplied with the changers.

These changers automatically shuts off after the last record has been played.

Models RC-98 and RC-88 is suitable for use on 100/130 or 200/250 volts, at either 50 or 60 cycles according to the motor pulley supplied.

Manufactured by:

Garrard Engineering & Mfg. Co., Ltd.
Newcastle Street
Swindon, Wilts — England

U. S. Distributor:

Garrard Sales Corporation
164 Duane Street
New York 13, N. Y.

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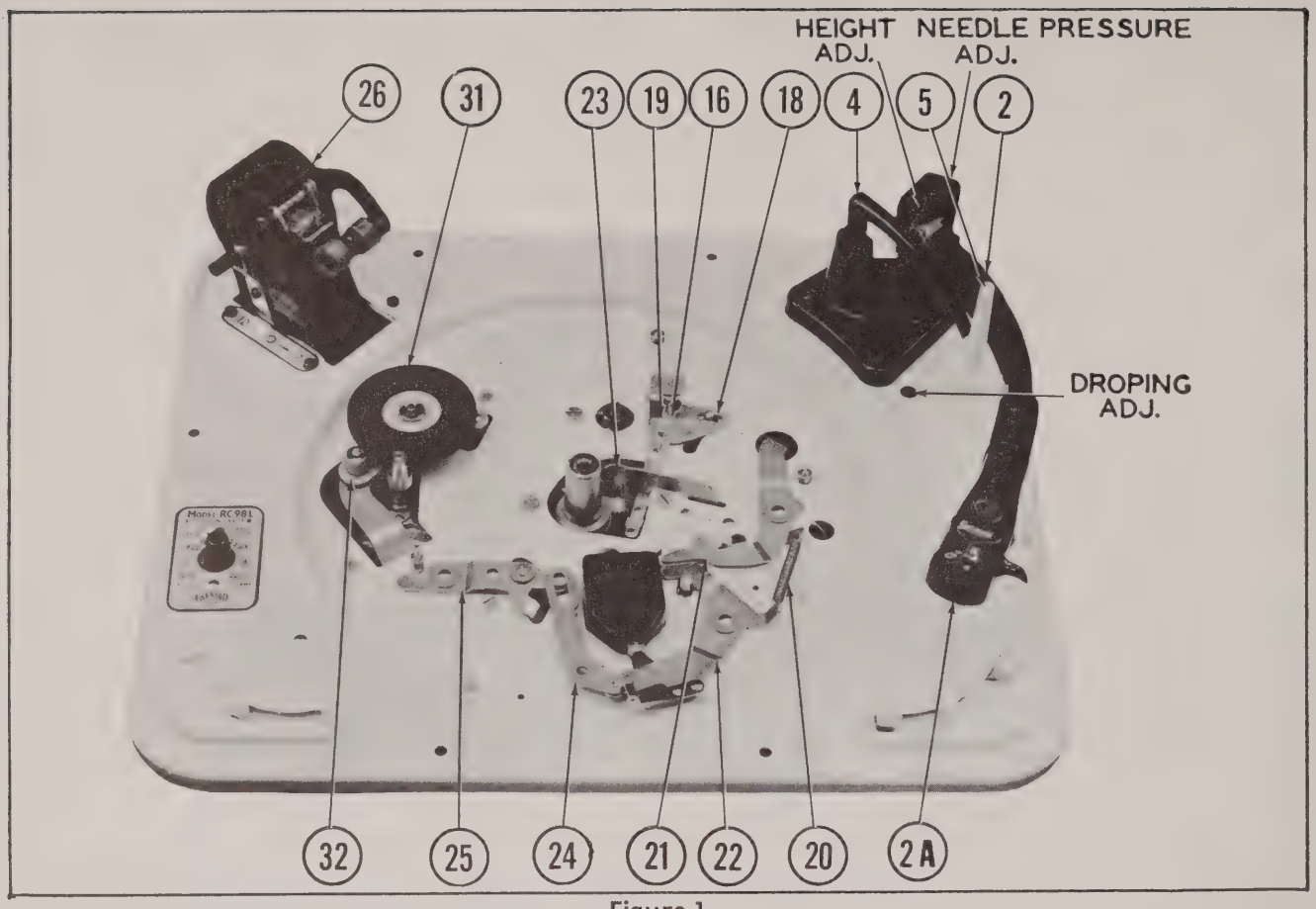

Figure 1

OPERATING INSTRUCTIONS

1. Insert the interchangeable plug-in head that accommodates user's personal choice of crystal, ceramic, or magnetic cartridges: turnover, twist, or simple plug-in types.

2. Place the correct spindle in position, the stepped sloping spindle for 78 or 33 1/3 RPM records, or the large spindle for 45 RPM records.

3. Set lever (28) at side of record platform (26) to position corresponding to size of record to be played.

4. Move speed control knob to desired speed, 78, 45, or 33 1/3 RPM.

5. Place any number of records up to eight, on the record spindle, lower record clip, and switch on by moving the front left hand knob (47) to "Start".

NOTE: When playing 7" 45 RPM record clip must be in the rear position.

To Reject A Record-

To reject a record at any time while changer is operating, move the right hand knob to "Reject" position and release.

Stopping-

If it is desired to stop the changer before it does so automatically, move the right hand knob to "Stop" position. If this is done while a record is playing that record will be rejected on switching on again.

Speed Regulation-

A variable speed control is fitted on the Model RC-98 and to set the speed accurately proceed as follows: Proceed as instructed under "Operating Instructions." Place one record on record spindle and switch on. When pickup commences to play place stroboscope disc, supplied with changer, on record and turn speed adjusting knob until the ring of dots on the stroboscope, coinciding with the speed indicated by the speed change knob, appears to remain stationary when viewed by light from a lamp on the appropriate AC power supply. The speed will now be correct.

Manual Operation-

The purpose of the manual control is to disconnect the changing mechanism so that single records can be played as on a single record player. To use this feature, move the Manual/Auto knob to the Manual position, fit short spindle, supplied with unit, and switch on changer to allow the mechanism to complete its cycle. The pickup will then be free on its rest and can be handled and the unit used as a single record player. At the completion of the record the pickup will rise and return to it rest, leaving the turntable revolving. To stop motor and turntable, move right hand control knob to "Stop". On switching on again time must be allowed for unit to complete cycle once again.

NOTE: Should the record changer be stopped with the pickup arm not on its rest while the unit is set to Auto, the pickup should not be handled but the right hand knob should be moved to "Start" then the mechanism will operate and

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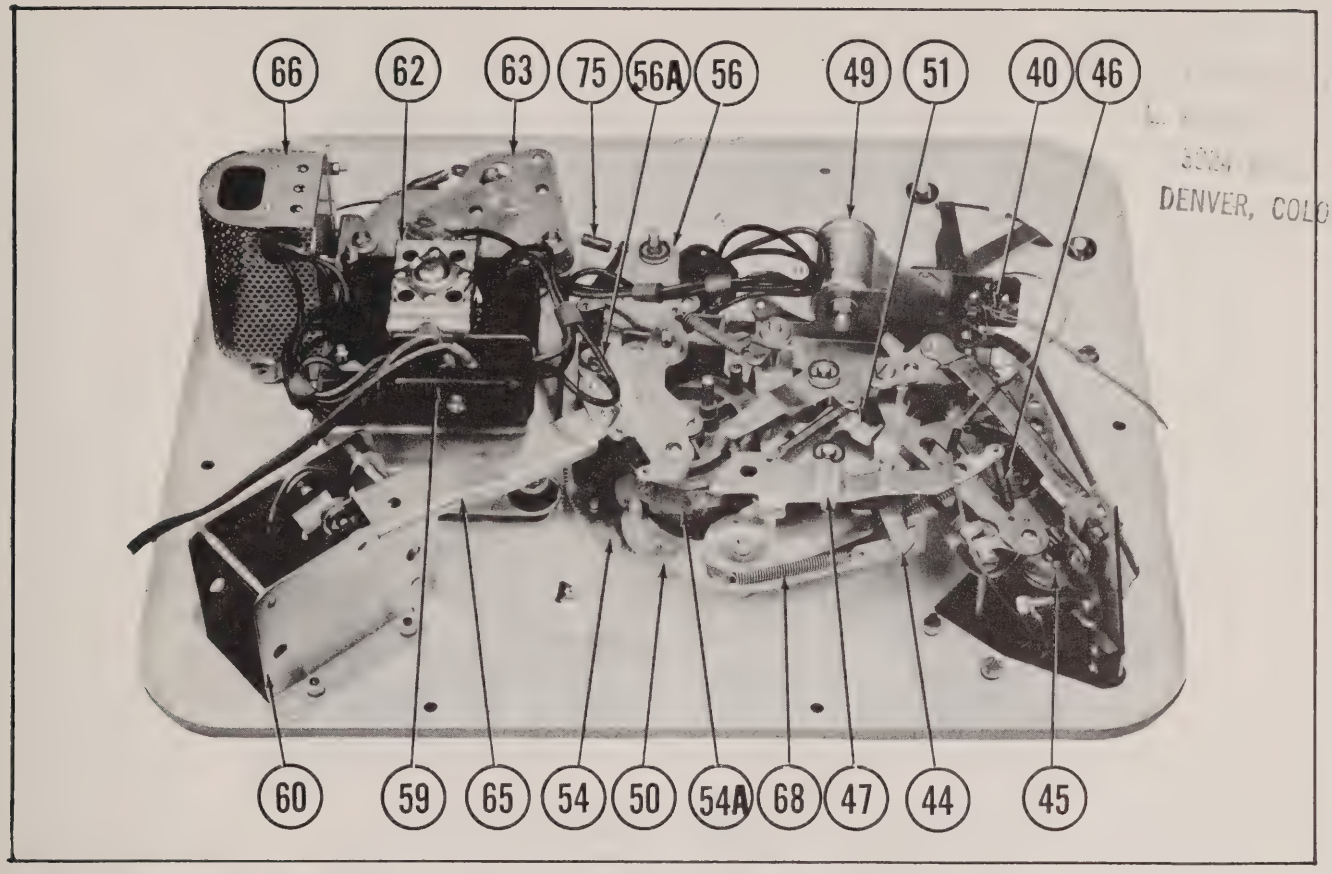

Figure 2

the pickup will lift to its rest. The pickup arm will not move from its rest unless one or more records are on the record spindle. This is a safety device designed to prevent the pickup being damaged should the changer be switched on without being loaded with records.

CHANGE CYCLE

The change cycle is put into operation by moving the "Stop-Start-Reject" knob (33) to "Reject" as knob is moved to "Reject" position several associated parts move simultaneously. Switch lever (22) latches with switch catch lever (21) closing switch (20). The motor is started and inter wheel (31) makes firm contact with motor pulley thru tension applied by support lever (74) spring, thus moving inter wheel (31) against the turntable rim rotating turntable (15). Reject lever (33) also moves stop actuating lever (34), which raises the stop lever (23) out of its stop position, releasing cycling gear (54) and cycling cam (54A), which are secured together and move in unison.

As the cycling gear (54) and cycling cam (54A) revolve, the lifting lever (45) is pivoted, due to the cam roller on lever (45) following the contour of cycling cam (54A). This, in turn, through its connected cam roller, closes the muting switch (40) and actuates the lifting crank (45A) which raises the lifting plate and spindle (38), thus raising the tone arm (2).

At this time, cycling cam (54A) makes contact with the shut-off cam lever (47) which pulls size selector & switch off arm (4) inward; however, with records on the spindle, the arm (4) is blocked from making its full inward travel, thereby preventing the shut off operation.

At this position of cam rotation, cycling cam (54A) pushes coupling link (65) back. This, in turn, actuates the record dropping mechanism, thus selecting the bottom record and dropping it to the turntable. At the same time, the 45 RPM spindle actuating lever assembly (53) is pivoted by cycling cam (54A). This actuates the 45 RPM spindle when it is used.

Cycling cam (54A) pivots the pickup actuating lever (50), causing its roller to engage the pickup lever (36) which, in turn, moves the tone arm outward. Now, the stud on the tone arm index lever (41) makes contact with the pickup lever (36) and moves the tone arm inward, by action of the index lever springs (42) and (43), until the ear on the tone arm index lever (41) contacts one of the set down steps on tone arm locator lever (44). The set down step in which the ear of tone arm index lever (41) engages is determined by the size record being played. This position the pickup arm for set down.

Lifting lever (45) now returns to its normal position; and, through the connected parts, the tone arm is lowered to the record and the muting switch (40) is opened.

At this time, by action of cycling cam (54A) and cycling gear (54) revolving in unison, the stop lever (23) reach a point on the cycling gear (54), where the stop lever (23) stops the cycling gear (54), and the teeth run out. The revolving of the turntable has no effect on the cycling gear (54), because of stop lever holding the cycling gear (54), this completes the change cycle.

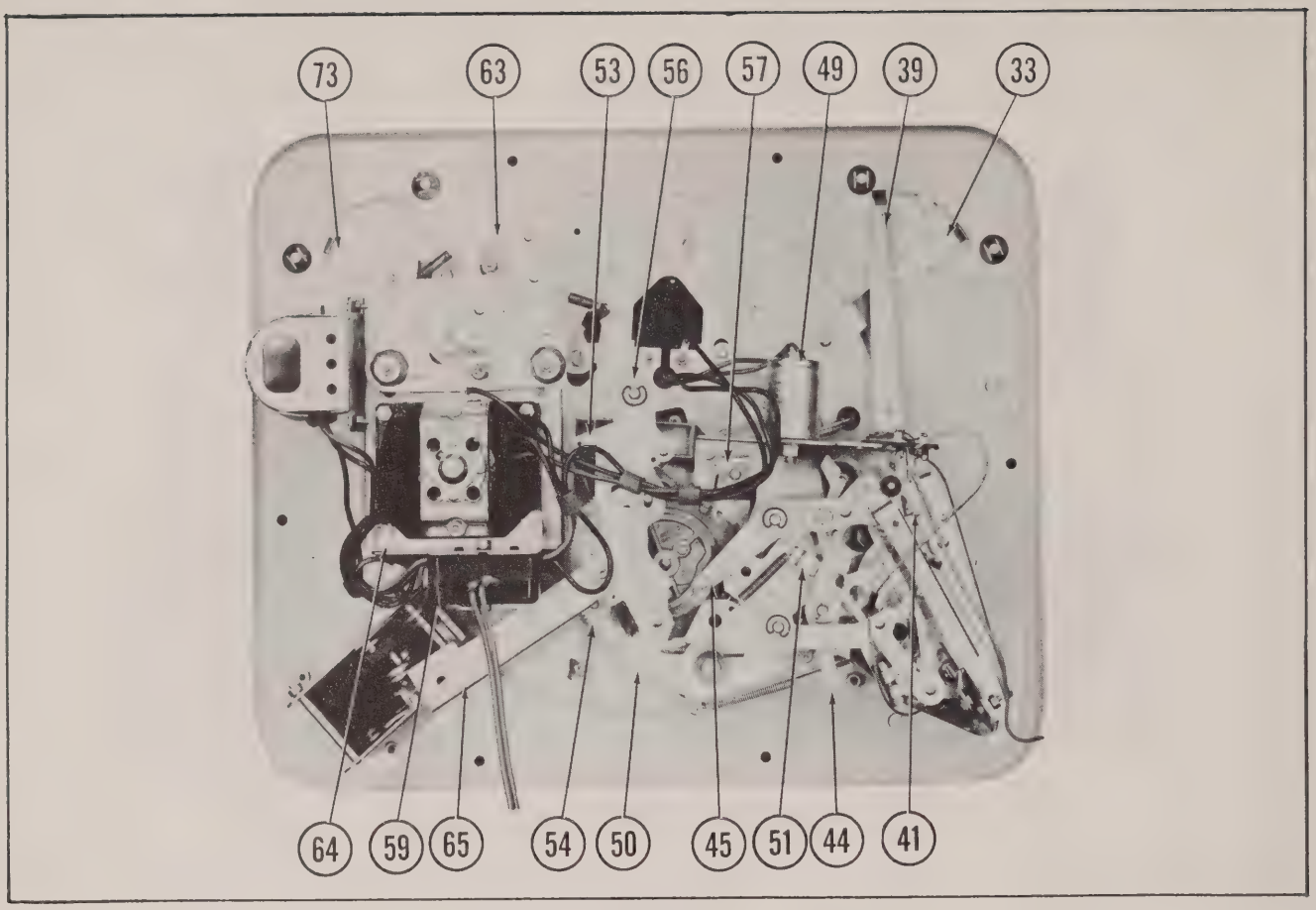

Figure 3

As the needle follows the grooves of a record and moves the tone arm in toward the spindle, pickup lever (36), which is secured to the tone arm shaft (38), engages and moves the auto trip actuating lever (48). This in turn, pivots friction plate (18) and automatic trip lever (16) toward main spindle (52A). While a record is playing, the slight inward movement by automatic trip lever (16) is not sufficient to trip the mechanism, because, on each revolution of main spindle (52A), the wiping contact by the spindle striker moves the automatic trip lever (16) back.

When the tone arm reaches the end of the music grooves, its movement is accelerated. This increase the movement of the automatic trip lever (16) which is caught by the striker on main spindle (52A) and lifted. This in turn lifts the stop lever (23) up and out of the notch in the cycling gear. The cycling gear (54) is then free to rotate, this starts the mechanism in to cycle.

AUTOMATIC SHUT-OFF

When the last record has been played, the change cycle starts again. Since there are no records on the spindle, the size selector and switch off arm (4) is allowed to move in far enough for shut-off lever (47) to push pickup locator lever (44), which latches pickup actuating lever (50) so that its outward travel is stopped. When cycling cam (54A) rotates, the pickup actuating lever (50) is held so that the protrusion on the pickup actuating lever moves to the outside of the cycling cam (54A), thereby, pushing pickup actuating lever (50) into the catch lever (21), releasing switch lever (22), which shuts off unit.

ADJUSTMENTS

Pickup Height Adjustment-

The distance the pickup lifts can be adjusted by turning the screw (3) on top of pickup arm, see Figure (1), with a small screwdriver. Eight 12" 78 RPM records should be placed on the turntable and the pickup height adjusted so that as the pickup returns to the rest on completion of the top record the tip of the pickup stylus clears the record surface by 1/8".

Pickup Dropping Position Adjustment-

The pickup arm dropping position is factory set for optimum accuracy but should any minor adjustment be required to accommodate abnormal records, rotate the screw accessible through the hole in the unit plate as shown in Figure (1). This adjustment can only be made with the pickup arm on its rest.

Needle Pressure Adjustment (See Figure 1)-

The needle pressure for playing microgroove records must not exceed 10 grams and it is strongly recommended that an occasional check be made with a stylus pressure gauge obtainable from your dealer. To adjust the stylus pressure turn the screw (1) at the rear of the pickup arm, Figure (1), clockwise to reduce pressure and counter-clockwise to increase it.

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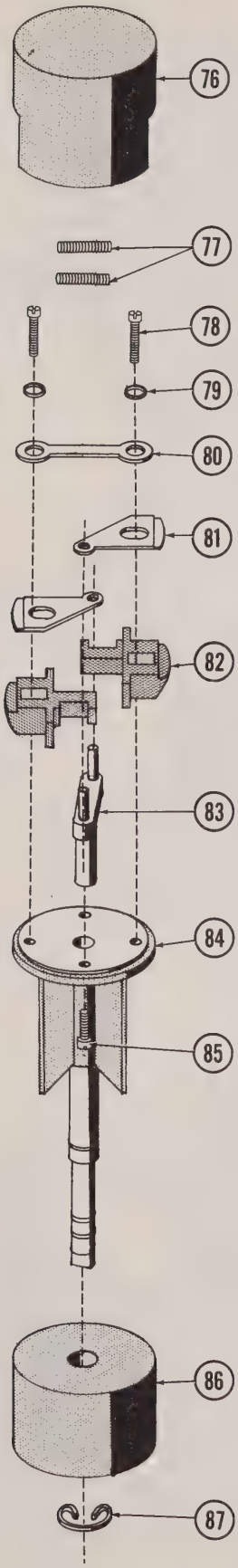

A PHOTOFACT "EXPLODED" VIEW
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Figure 4. 45 RPM Spindle.

Record Dropping Adjustment-

If the changer fails to drop records other than the 45 RPM type having a large centre hole, first make sure that the records are not badly warped. If they are reasonably flat, the record pushing pawl setting should be checked and adjustments made if necessary. To adjust the position of the record pushing pawl, the eccentric pin accessible under the unit plate (See Figure 2) should be turned with a screwdriver. Also check the record spindle by laying it on the template (Figure 9) to see that it is not bent out of position.

Should record fail to drop correctly when using the large diameter record spindle type LRS. 3, replace this spindle with the sloping one and see that it leans towards the record platform and is directly in line with it. If this spindle is out of position, it should be set correctly by loosening the two screws located on front of main spindle housing (52). Turn the record spindle until it is in line with the centre of the record platform and retighten the screws.

Velocity Trip Adjustment-

The auto trip mechanism is the velocity type, that is it operates by the quick inward movements of the pickup arm when the pickup reaches the run off groove at the end of the record. The auto trip is of a special design to be very light and sensitive in operation and is set to commence operation when the stylus reaches a 2 7/8" radius from the centre. If the auto trip (16) fails to operate the pickup will remain running in the centre of the record and to correct this remove the turntable (15) and raise the auto trip operating lever (16) by giving the "adjusting screw (19) for height of auto trip operating lever," (See Figure 1), about half a turn in a clockwise direction. This will raise the auto-trip operating lever (16) and enable it to engage the cam on the striker when the pickup runs into the record run-off groove.

Cartridge Muting Switch-

A cartridge muting switch (40) is connected across the pick-up cartridge to short circuit the pick-up except when the changer is in the playing position. It is important to note that no sound will be obtained from the pick-up by flicking the needle when the pick-up is on its rest. The muting switch contacts should be closed except when the changer is in its playing position. Should this switch fail to operate, clean the contact faces, and insure that they make and break according to the position of the changer mechanism.

TROUBLES

Changer Fails To Reject Or Trip-

1. Check velocity trip as described under "Velocity Trip Adjustment".

2. Friction plate (18) binding preventing trip operating lever (16) from moving inward.

Speed Variation-

1. It is essential that driving surfaces of brass motor pulley, rubber inter wheel, and turntable drum

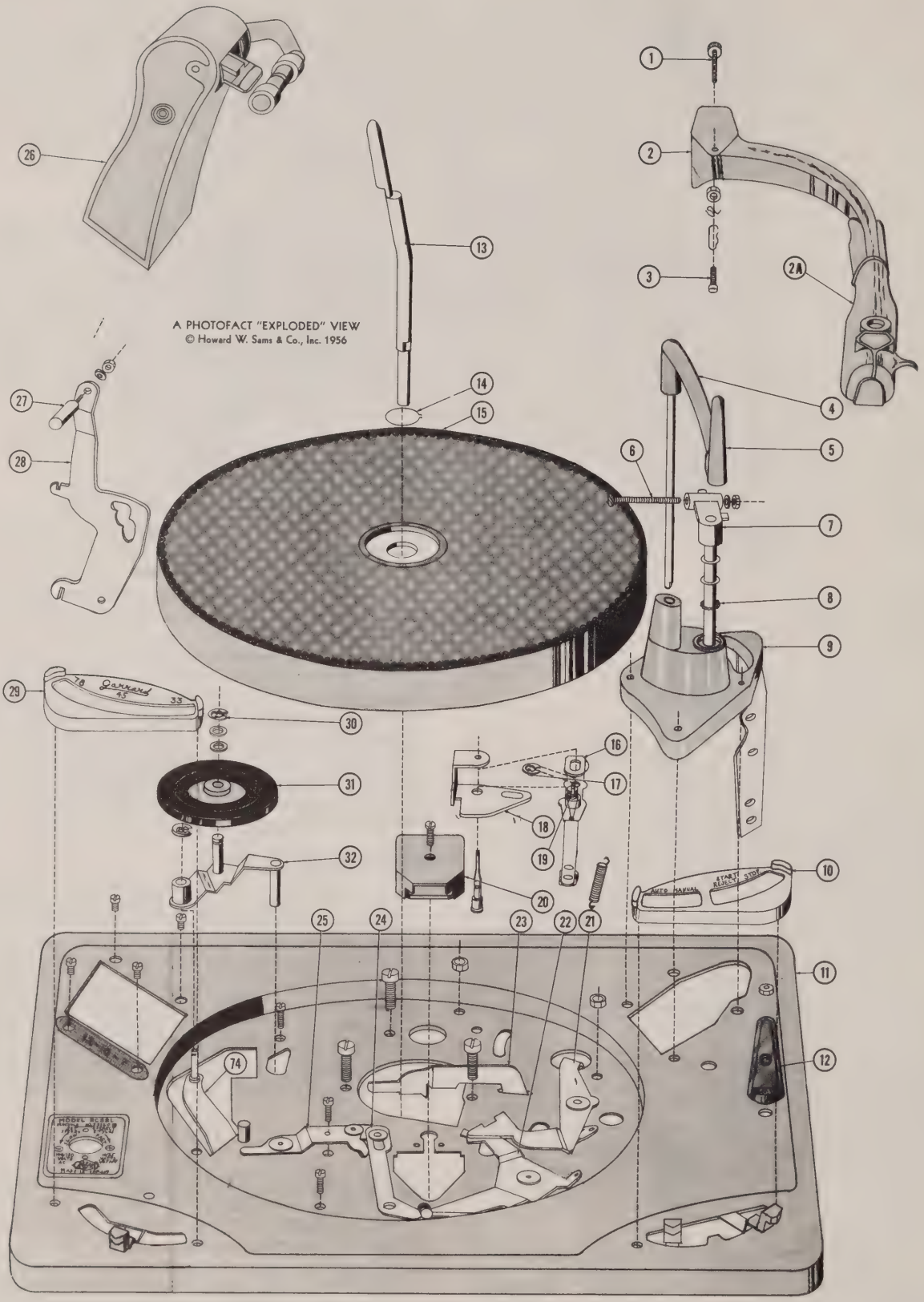

Figure 5A. Exploded View Of Parts Above Baseplate.

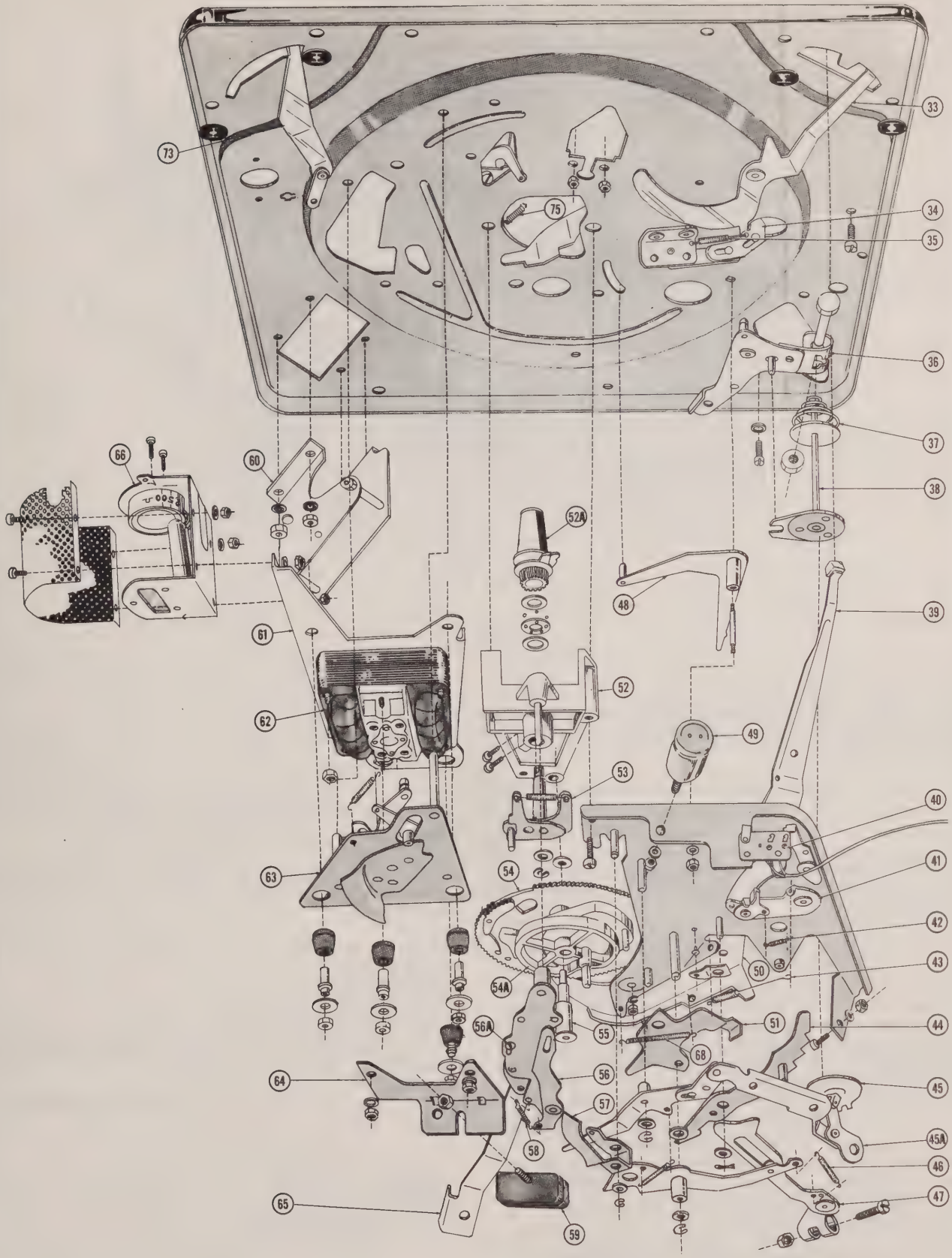

Figure 5B. Exploded View Of Parts Below Baseplate.

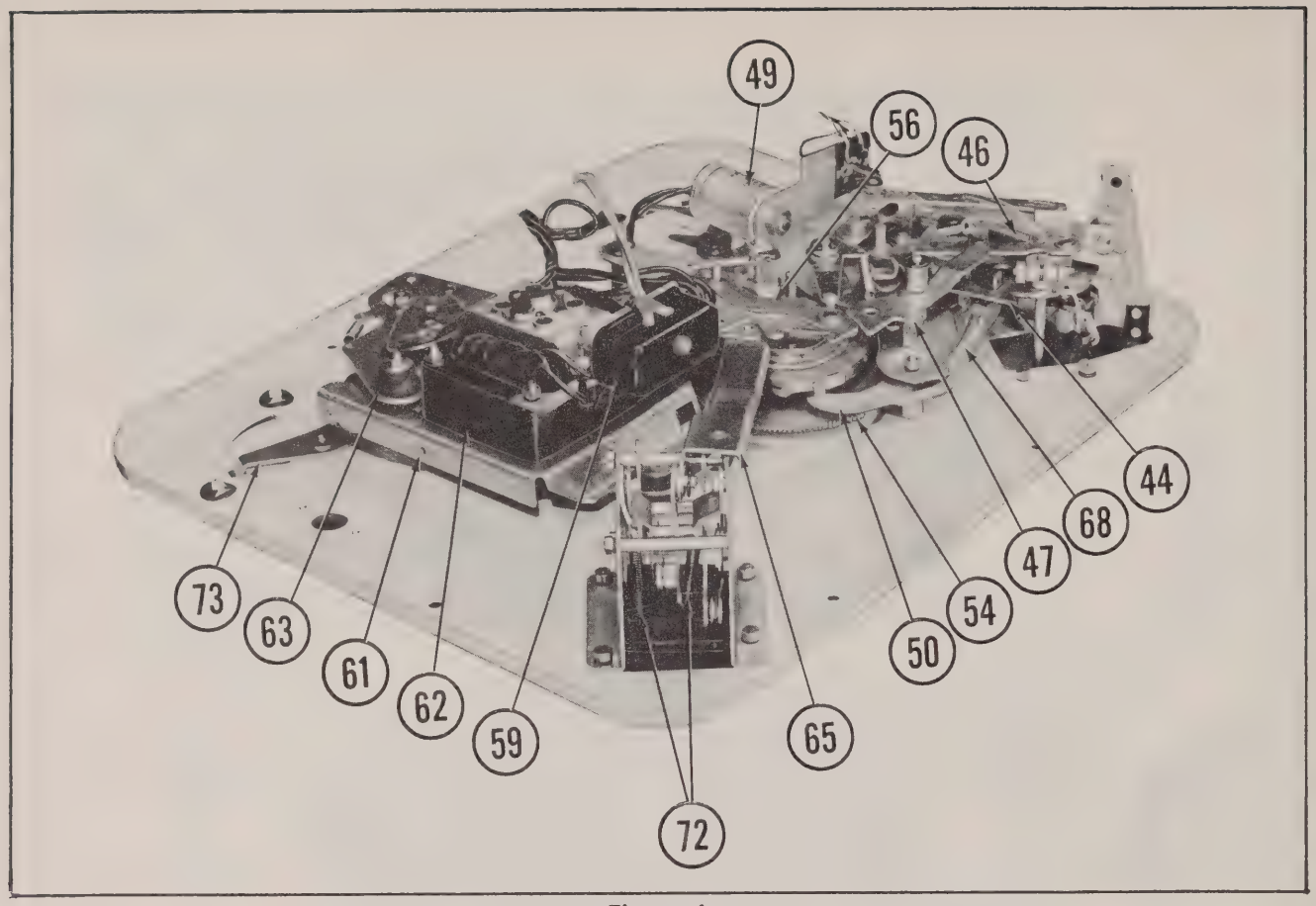

Figure 6

be kept absolutely free from oil or grease. This is the first point which should be checked if the turntable speed varies. The pulley and idlers should be cleaned with a dry cloth if these parts have been subjected to oil or grease.

2. Also check that the motor pulley is in its correct position on the motor shaft; switch the changer on and see that the inter wheel runs in the centre of the appropriate step on the pulley and does not foul the side of the adjacent step. If necessary loosen the screws holding pulley to shaft and move pulley to its correct position.

3. See that the turntable spindle (52A) has a small amount of end play. To check this, with the turntable removed grip the turntable spindle (52A) firmly, lifting it up and down. If no movement is felt, loosen the screws which hold the fixed portion of the turntable spindle (52A), raise the turntable spindle a very small amount and retighten the screws. There should be approximately .005" end play.

4. If a thick oil has been used to lubricate the motor bearings, the motor will appear weak or will not start. It will then be necessary to dismantle the motor and clean away all traces of the thick oil. It is therefore, essential to lubricate the motor bearings with a good quality thin oil.

Needle Does Not Track Across Record Properly-

1. Needle may be clogged by accumulation of lint, dirt, etc.

2. Check condition of needle tip.

3. Check tone arm weight as described under "Needle Pressure".

4. Check tone arm pivot points for freedom of movement.

5. See that the changer is floating freely on its suspension springs, otherwise, the slightest vibration can cause the needle to skip across grooves.

6. Check the pick-up lead to see that it has enough slack to allow the needle to fully seat in the record grooves.

Turntable Does Not Revolve When Control Is Moved To "Start"-

1. No current at motor.

(a) Check that current is reaching terminal block.

(b) Check that switch (20) is operating properly.

(c) Check wiring and terminal connections in changer.

2. Motor defective.

(a) Remove turntable and allow motor to operate without load. If current is reaching motor and drive shaft does not rotate, the motor is defective. Repair or replace.

3. Inter wheel (31) not contacting motor shaft.

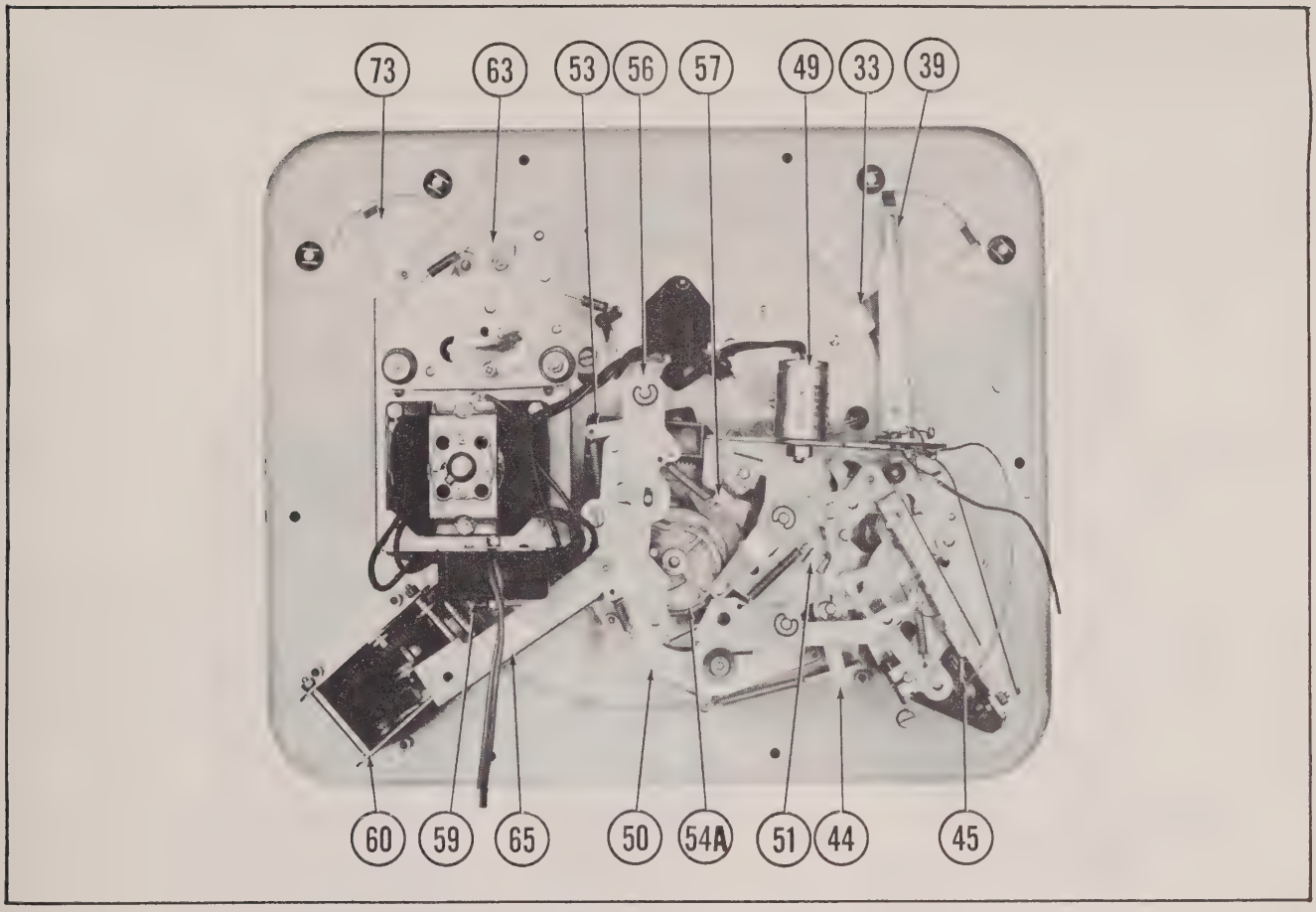

Figure 7. Bottom View Of Model RC-88.

(a) Check that spring (75) is not loose or missing.

Tone Arm Strikes Records On Spindle During Cycle-

1. Tone arm height not adjusted properly.

(a) See instructions for adjusting tone arm height under "Adjustments".

Noise During Playing Of Record-

1. Motor rumble.

(a) If a low pitched rumbling sound comes from the loudspeaker while a record is being played, check motor grommets to be sure the motor is freely suspended on them. The motor leads should have slack to allow the motor to float. Motor rumble may also come from an unbalanced motor rotor; in this case replace motor.

2. Defective turntable bearings.

(a) Defective turntable bearings can cause rumble. Check for foreign matter in the bearings, defective balls, binding between balls and ball retainer; rough surface on washers. Clean bearing assembly and lubricate with light mineral oil.

3. Defective drive wheel tire (31).

(a) A rapid thumping sound while the motor is running may indicate a flat spot on the drive wheel tire. If this condition does not clear up after a few minutes of running time, remove the turntable and inspect the rubber tires. If the tire surface is not even and smooth, replace the part. Should the bearing of the part show signs of excessive wear or be extremely wobbly, the defective drive wheel should be replaced.

4. Defective record.

(a) Worn or defective records cause needle scratch and distortion of the recorded sound. If a record is warped, it may slip on the other record causing "Wow" (a waver in the recorded sound). A chipped or enlarge centre hole in a record can also cause "Wow".

5. Defective needle.

(a) A defective needle will cause an excessive scratchy sound and will greatly reduce record life. Do not permit the use of a needle to its complete limit of wear. Best results are obtained by installing a new stylus periodically before defective reproduction becomes apparent.

LUBRICATION

The motor and drive wheel bearings are of the oilite type and rarely need lubricating. When the need for oil is apparent use a good grade of light machine oil.

CAUTION: Apply only one or two drops of oil on each bearing surface. Carefully remove every trace of surface oil before operating the changer.

Occasionally especially if the changer mechanism becomes rather noisy, put a smear of grease such as Lubriplate on all cam faces, and lightly lubricate all lever pivots.

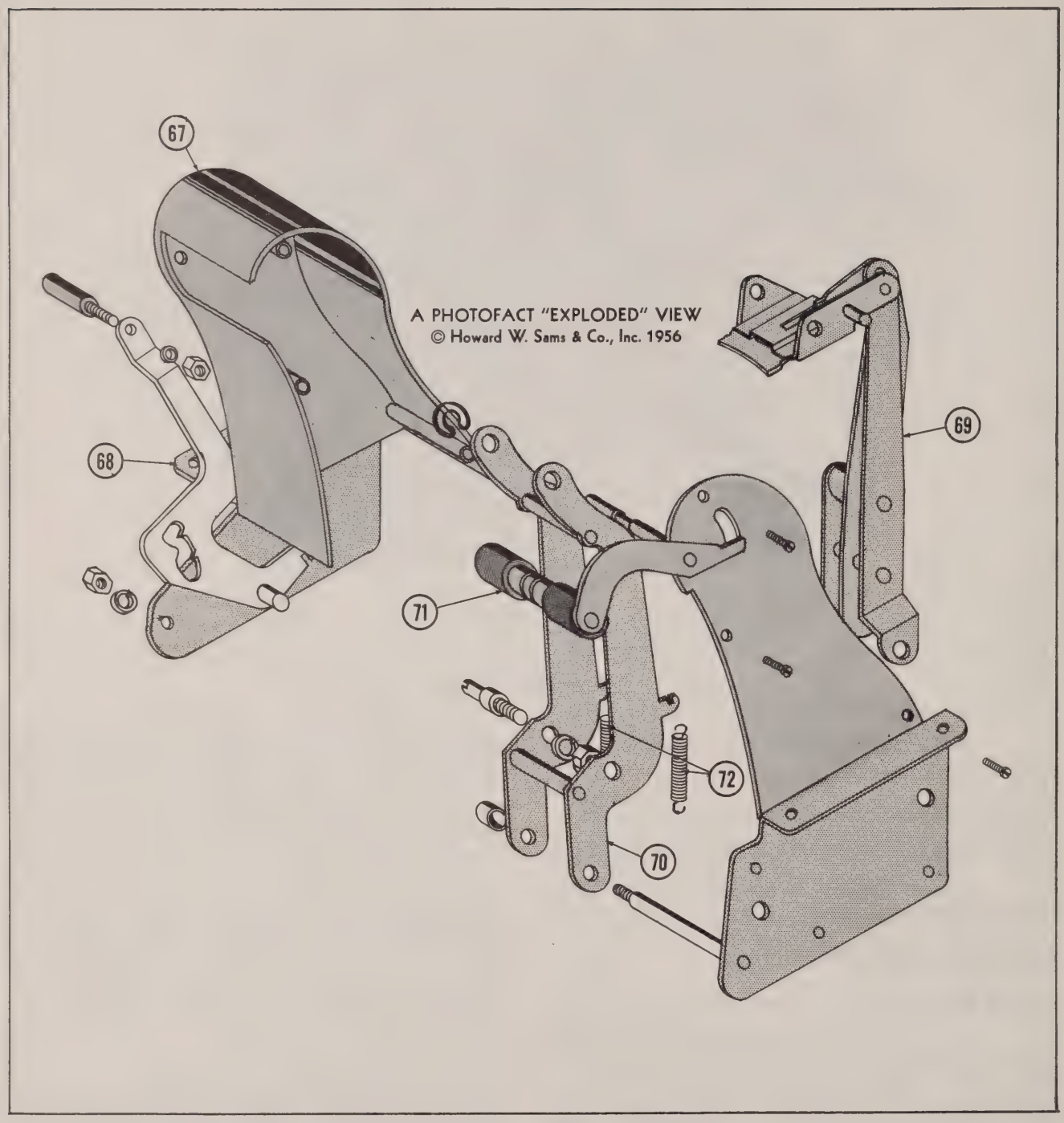

Figure 8. Record Platform Assembly

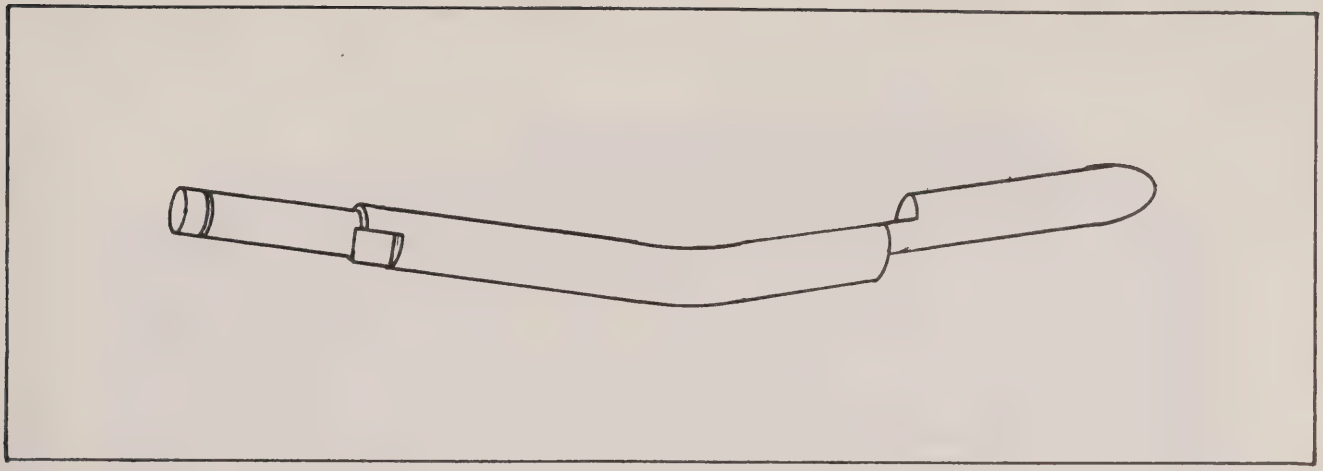

Figure 9. Template For Record Spindle.

MECHANICAL PARTS LIST

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
1		Stylus Pressure Adjusting Screw	39		Auto-Manual Lever
			40		Muting Switch
2	B. 52900	Pickup Arm	41		Index Lever
2A	A. 52226	Plug-in Pickup Case Assembly	42		Index Lever Spring
3		Pickup Height Adjustment Screw	43		Spring
			44		Pickup Locator Lever
4		Size Selector & Switch Off Arm	45		Pickup Crank Lift Assy.
5		Plastic Extension Cap	46		Spring
6		Arm Mounting Screw	47		Shut-Off Cam Lever
7		Pickup Arm Mounting Bracket	48		Auto Trip Actuating Lever
8		Ball Bearings	49		Switch Click Suppressor
9		Pickup Arm Mounting Base	50		Pickup Actuating Lever
10		Start-Stop Escutcheon	51		Pickup Locator Push Lever
11		Baseplate Assembly	52		Main Spindle Housing
12		Pickup Arm Rest	52A		Main Spindle
13	B. 52764	Record Spindle	53		45 RPM Actuating Lever
14		Turntable Retainer	54		Cycling Gear
15	C. 52406	Turntable	54A		Cycling Cam
16		Auto Trip Operating Lever	55		Cycling Cam Shaft
17		"C" Retainer	56		Record Pushing Pawl Actuator
18		Friction Plate	57		Cycling Gear Tension Lever
19		Auto Trip Operating Adjustment Screw	58		Spring
			59		Power Supply Connecting Block
20		Switch Assembly	60		Mounting Bracket, Record Platform Assembly
21		Catch Lever			
22		Switch Lever	61		Motor Mounting Plate
23		Stop Lever	62		Motor
24		Lever (Part of Item 22)	63		Speed Shifting Assembly
25		Tension Lever (Part of Item 22)	64		Power Supply Connecting Block Mounting Bracket
26		Record Platform Assembly			
27		Change Over Lever Knob	65		Coupling Link
28		Change Over Lever, Record Size	66		Speed Adjusting Control
			67		Record Platform Cover
29		Speed Change Escutcheon	68		Mounting Bracket & Change-Over Lever
30		"C" Retainer			
31	B. 52567	Inter Wheel	69		Push-Off Lever Assembly
32		Inter Wheel Mounting Bracket	70		Positioning Lever Assembly
33		Start-Stop-Reject Lever	71		Record Hold-Down Arm
34		Stop Actuating Lever	72		Spring, Positioning Lever
35		Stop Lever Tension Spring	73		Speed Change Lever
36		Pickup Lever	74		Support Lever
37		Pickup Compression Spring	75		Spring
38		Pickup Lift Plate & Spindle			

RETMA MEMBER

GRANCO
MODELS 730P, 740P

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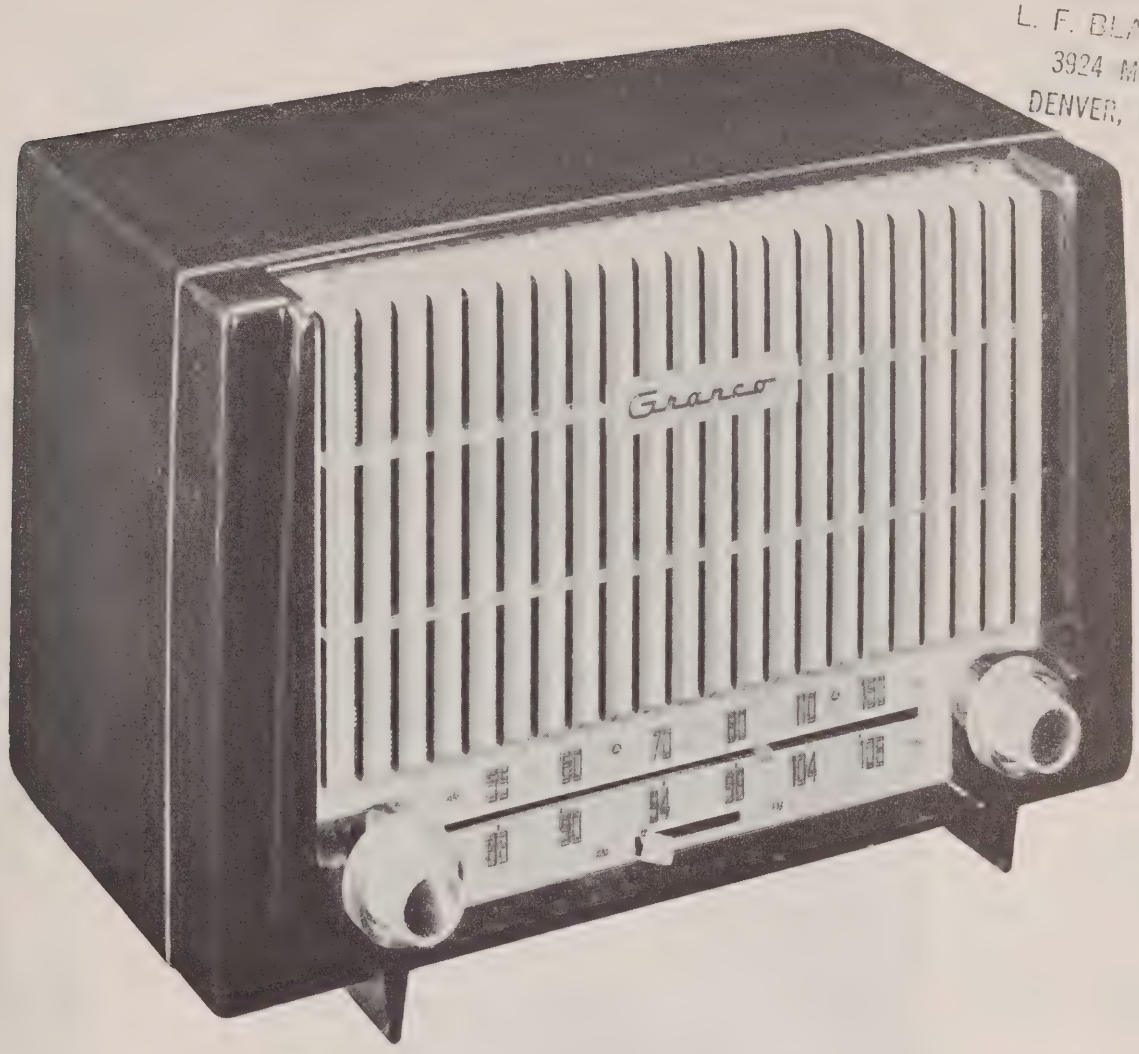
GRANCO
MODELS 730P, 740P



GRANCO
MODELS 730P, 740P

TRADE NAME	Granco Models 730P, 740P		
MANUFACTURER	Granco Products, Inc. , 36-07 20th Ave. , Long Island City 5, N. Y.		
TYPE SET	AC-DC Operated FM-AM Superheterodyne Receiver		
TUBES (Seven)	Types 12BA6 FM RF Amplifier, 12AT7 FM Mixer-Osc. , 12BE6 AM Converter, 12BA6 1st IF Amplifier, 12BA6 2nd FM IF Amp. -AM Det. , 19T8 Ratio Det. -AF Amp. , 35C5 Output.		
POWER SUPPLY	105-120 Volts AC-DC	RATING	. 32 Amp. @ 117 Volts AC
TUNING RANGE - BROADCAST	535KC - 1650KC	FM	88MC - 108MC

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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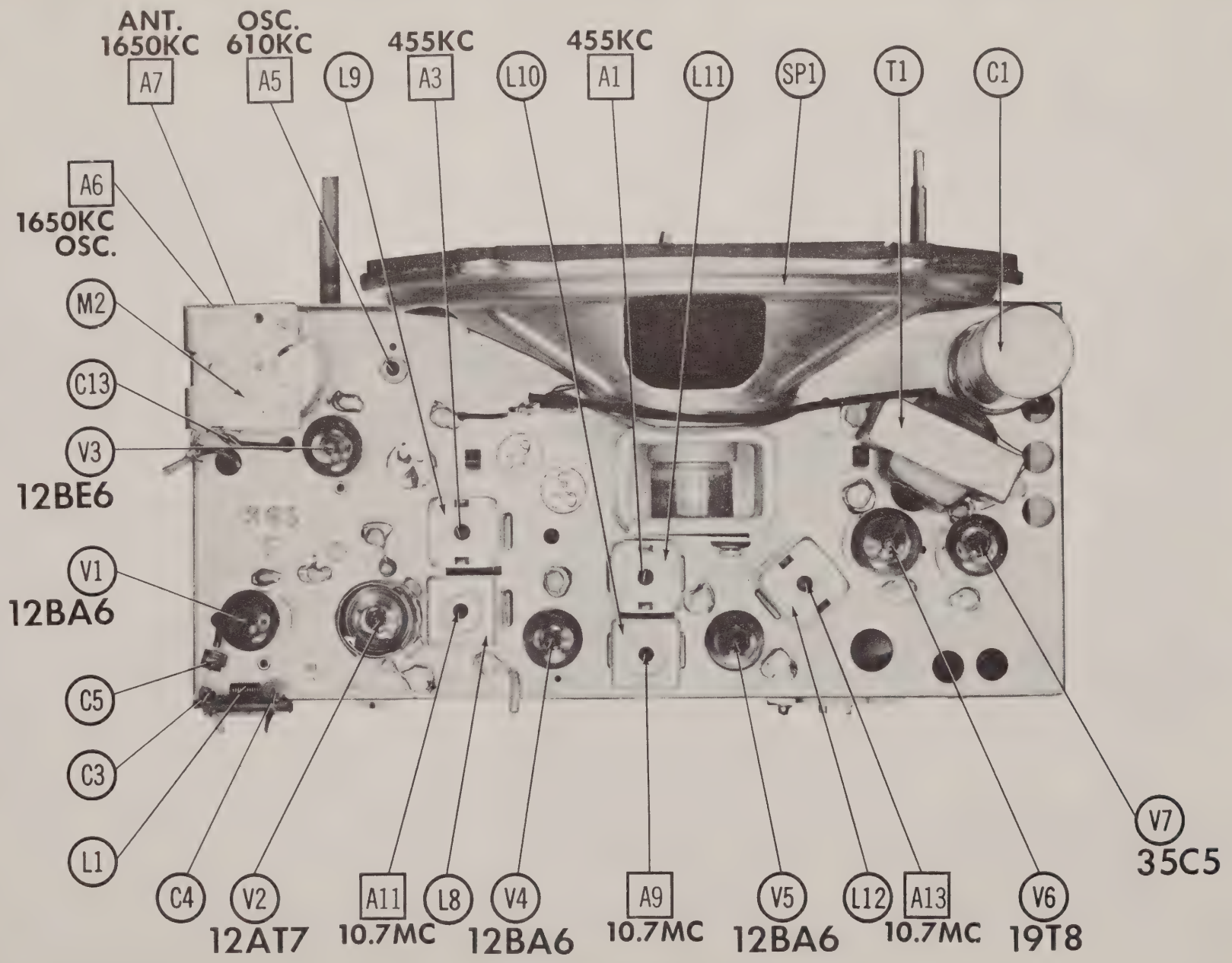
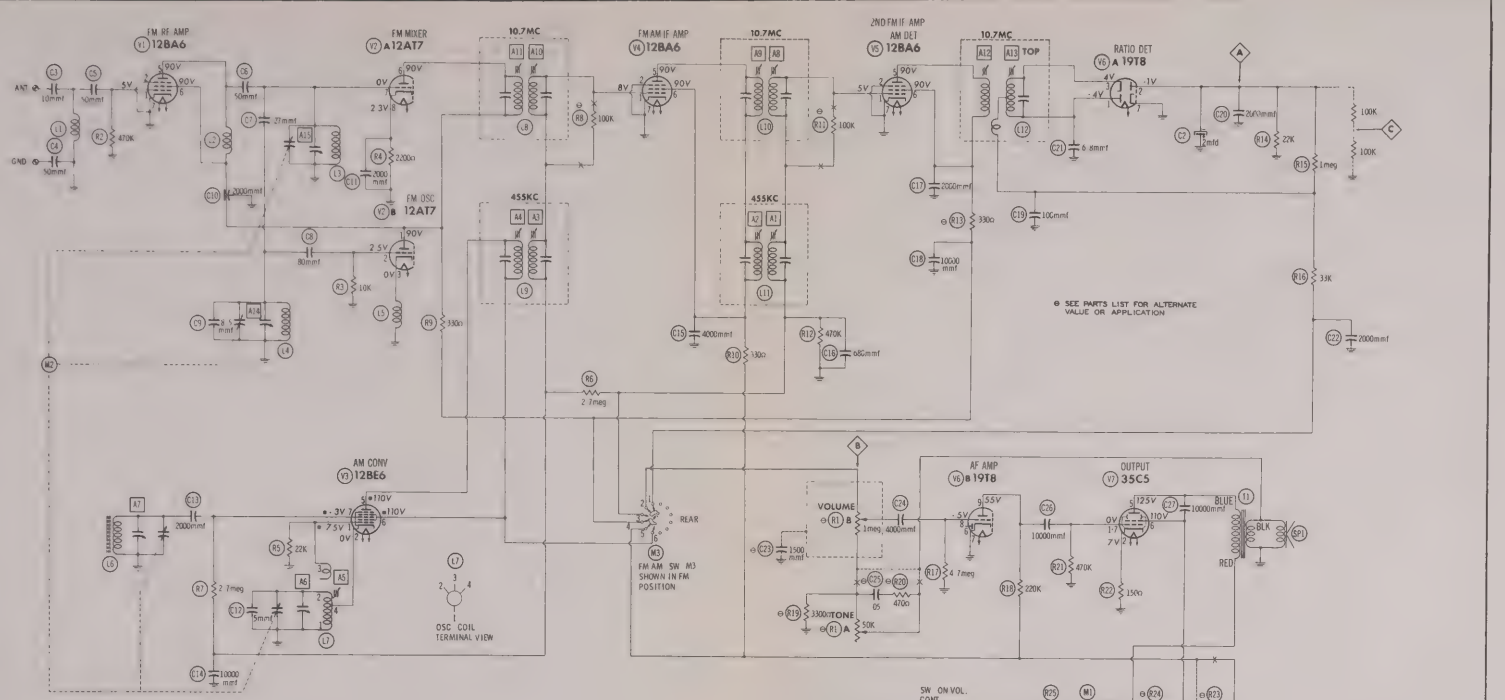


CHASSIS-BOTTOM VIEW



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	12BA6	470K	0Ω	22Ω	10Ω	↑1200Ω	↑1200Ω	0Ω		
V2	12AT7	↑1200Ω	10K	.3Ω	10Ω	0Ω	↑1200Ω	0Ω	2200Ω	5Ω
V3	12BE6	22K	.5Ω	70Ω	80Ω	● ↑900Ω	◆ ↑900Ω	5Meg		
V4	12BA6	3Meg	0Ω	22Ω	35Ω	↑1200Ω	↑1200Ω	0Ω		
V5	12BA6	470K ● 320K	0Ω	35Ω	44Ω	↑1200Ω	↑1200Ω	0Ω		
V6	19T8	500K	22K	500K	55Ω	70Ω	NC	0Ω	4.7Meg	↑220K
V7	35C5	470K	150Ω	80Ω	115Ω	↑170Ω	↑560Ω	470K		

ALL MEASUREMENTS TAKEN IN "FM" POSITION UNLESS OTHERWISE DESIGNATED.
↑ MEASURED FROM OUTPUT OF M1.
● MEASURED IN "AM" POSITION.
NC NO CONNECTION

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements

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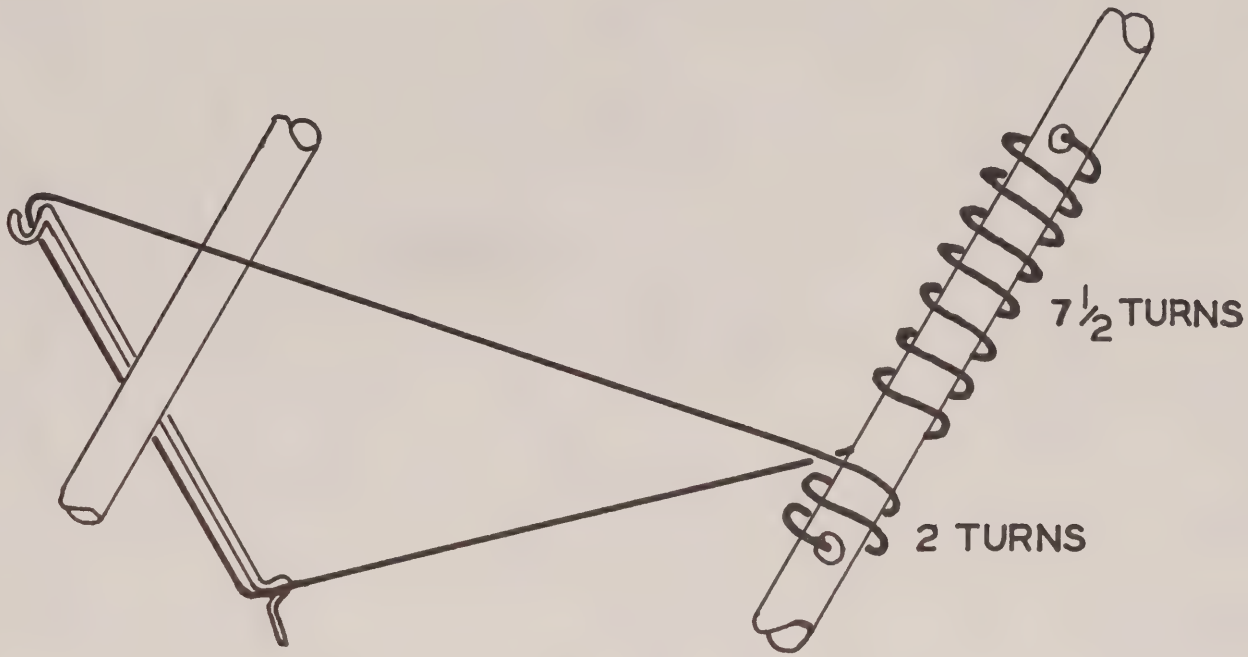
338-6

AM TUNING GANG FULLY CLOSED & FM TUNING SLUGS SET TO LOWEST FREQUENCY.

KNOT TIED ON EACH END OF DIAL CORD PULLED INSIDE OF HOLES.



L. F. D. CO.
3024 MEADE ST.
DENVER, COLORADO

DIAL CORD DRIVE

GRANCO
MODEL 730P

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Loop should be maintained in same relative position to chassis as when receiver is in cabinet.
Use isolation transformer, if available. If not, connect a .1MFD capacitor in series with low side of signal generator and B-.
To set pointer, turn tuning capacitor fully closed and set pointer to last reference mark at low frequency end of dial.

AM ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
1.	.1MFD	High side to pin 7 (grid) of 12BE6 (V3). Low side to chassis.	455KC (400∿ Mod)	AM	Tuning gang fully open.	Across voice coil.	A1, A2, A3, A4	Adjust for maximum deflection.
2.		Loop	610KC	"	Tune to 610KC signal.	"	A5	Adjust for maximum deflection while rocking tuning gang.
3.		"	1650KC	"	Tuning gang fully open.	"	A6, A7	Adjust for maximum deflection. Repeat steps 1, 2 and 3.

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Connect two matched 100KΩ (±1%) resistors in series from point Ⓐ to chassis. The junction of these two resistors is alignment point Ⓒ as shown on the schematic.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
4.	.01MFD	High side to pin 7 (grid) of 12AT7 (V2). Low side to chassis.	10.7MC (unmod)	FM	Point of non-interference.	DC probe to point Ⓐ. Common to chassis.	A8, A9, A10, A11, A12	Adjust for maximum deflection.
5.	"	"	"	"	"	DC probe to point Ⓑ. Common to point Ⓒ.	A13	Adjust for zero reading. A positive and negative reading will be obtain on either side of the correct setting.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60∿ modulation and 450KC sweep. Use 120∿ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
4.	.01MFD	High side to pin 7 (grid) of 12AT7 (V3). Low side to chassis.	10.7MC (450KC Swp)	FM	Point of non-interference.	Vert. amp. to point Ⓐ. Low side to chassis.	A8, A9, A10, A11, A12	Disconnect stabilizing capacitor C2. Adjust for curve of maximum amplitude and symmetry similar to Fig. 1.
5.	"	"	"	"	"	Vert. amp. to point Ⓑ. Low side to chassis.	A13	Reconnect stabilizing capacitor C2. Adjust so that 10.7MC occurs at center of crossover lines similar to Fig. 2. SLIGHTLY retouch A12 for maximum amplitude and straightness of crossover lines.

FM RF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
6.	Two 39Ω carbon resistors	Across FM antenna leads with 39Ω in each lead.	108MC	FM	108MC (Tuning slugs out.)	DC probe to point Ⓐ. Common to chassis.	A14, A15	Adjust for maximum deflection.
7.	"	"	88MC	"	88MC (Tuning slugs in.)	"	L3, L4	Adjust for maximum deflection by expanding or compressing coil turns.

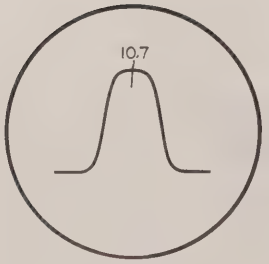


FIG. 1

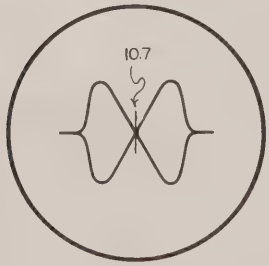
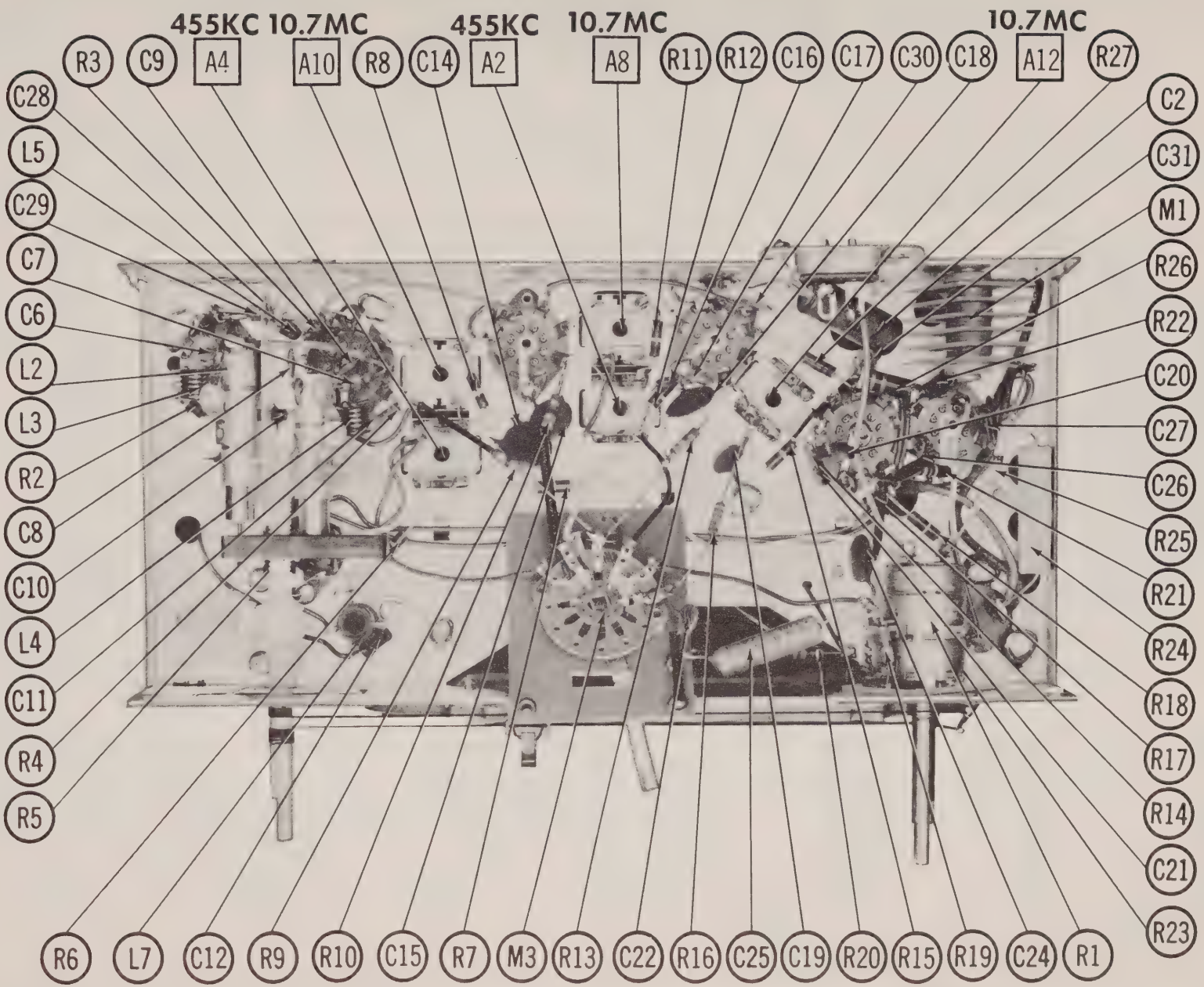


FIG. 2



CHASSIS TOP VIEW

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	FM RF Amplifier	12BA6	
V2	FM Mixer-Osc.	12AT7	
V3	AM Converter	12BE6	
V4	1st IF Amplifier	12BA6	
V5	2nd FM IF Amp. - AM Det.	12BA6	
V6	Ratio Det. -AF Amp.	19T8	
V7	Output	35C5	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	GRANCO PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	■80	150	AC628	AFH3-11	C010		TMT12	T-050	R2302*
B	▲50	150						MT-1530	
C	50	150	(Note 1)						
C2	2	50		PRS50V2	BBR2-50	TC302	TD-2-50	MT-0502	TVA-1301

Note 1: In model 730P, C1C is not used (C1 part #AC471).
* Non catalog item.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	GRANCO PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C3	10			NP0-SI10	TCZ-10	TZ09	NP0A-100	ZT-541	5TCC-Q1	
C4	50			NP0-SI50	TCZ-50	Z034	NP0-338-500	ZT-545	5TCC-Q5	
C5	50			NP0-SI50	TCZ-50	Z034	NP0-338-500	ZT-545	5TCC-Q5	
C6	50			NP0-SI50	TCZ-50	Z034	NP0-338-500	ZT-545	5TCC-Q5	
C7	.27									
C8	80									
C9	8.5									
C10	2000									
C11	2000			BPD-002	DD-202	K072	801-002	DC522	5HK-D2	
C12	5						N330A-4R7			
C13	2000			BPD-002	DD-202	K072	801-002	DC522	5HK-D2	
C14	10000			BPD-01	DD-103	K082	811-01	DC511	5HK-S1	
C15	4000			BPD-004	D6-402	K078	811-004	UC-5240	5HK-D4	
C16	680			BPD-00068	DD-681	G065	811-681	UC-5368	5GA-T68	
C17	2000			BPD-002	DD-202	K072	801-002	DC522	5HK-D2	
C18	10000			BPD-01	DD-103	K082	811-01	DC511	5HK-S1	
C19	100			BPD-0001	DD-101	G042	801-101	UC-531	5GA-T1	
C20	2000			BPD-002	DD-202	K072	801-002	DC522	5HK-D2	
C21	6.8			NP0-DI6.8	TCZ-6R8	Z013	NP0A-6R8	ZT-5568	5TCCB-V68	
C22	2000			BPD-002	DD-202	K072	801-002	DC522	5HK-D2	
C23	1500			BPD-0015	DD-152	K071	801-0015	DC5215	5HK-D15	Note 2
C24	4000			BPD-004	D6-402	K078	811-004	UC-5240	5HK-D4	
C25	.05	200		BPD-05	DF-503	CUB285		PT415	2TM-S5	Note 3
C26	10000			BPD-01	DD-103	K082	811-01	DC511	5HK-S1	
C27	10000			BPD-01	DD-103	K082	811-01	DC511	5HK-S1	
C28	2000									
C29	2000									
C30	2000			BPD-002	DD-202	K072	801-002	DC522	5HK-D2	
C31	2000			BPD-002	DD-202	K072	801-002	DC522	5HK-D2	

Note 2: Not used in some versions.
Note 3: Not used in model 730P.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	GRANCO PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	50K	1/2	AO-631A	F1-29		♦	UF54L	Tone (Note 1)
B	1Meg			R2-51			UR16L	Volume
C	Switch			KB-1			US-26	Attach to R1B
R1A	1Meg	1/2	AO-627-A	B-69-S	A47-1Meg-S	Q11-137	U54	Volume (Note 2)
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R1A
C	Switch		Not Req.	Not Req.	SWE-12	76-1	US-26	Attach to R1A

Note 1: Used in model no. 740P only.
Note 2: Used in model no. 730P only.
♦Concentrikit Equivalent: Kit K-2, Base Elements & Shafts, B11-123 & R-116 (Panel)
B11-137 & R-130 (Rear)
76-1 Switch

PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	GRANCO PART No.	IRC PART No.	NOTES
R2	470K			BTS-470K	
R3	10K			BTS-10K	
R4	2200Ω			BTS-2200	
R5	22K			BTS-22K	
R6	2.7Meg			BTS-2.7Meg	
R7	2.7Meg			BTS-2.7Meg	
R8	100K			BTS-100K	Note 1
R9	330Ω			BTS-330	
R10	330Ω			BTS-330	
R11	100K			BTS-100K	Note 1
R12	470K			BTS-470K	
R13	330Ω			BTS-330	
R14	22K			BTS-22K	
R15	1Meg			BTS-1Meg	
R16	33K			BTS-33K	
R17	4.7Meg			BTS-4.7Meg	
R18	220K			BTS-220K	
R19	3300Ω			BTS-3300	Note 2
R20	470Ω			BTS-470	Note 2
R21	470K			BTS-470K	
R22	150Ω			BTS-150	
R23	330Ω	1		BTA-330	Note 2
R24	560Ω	7			Note 3
R25	22Ω	2		BW2-22	
R26	470Ω	1		BTA-470	
R27	10Ω			BTS-10	

Note 1: Not used in some versions.
Note 2: Not used in model 730P.
Note 3: Model 730P uses 900Ω 4W (WW) in this application.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	GRANCO PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T1	2700Ω	3-4Ω	T629	Z1001	Z-3025	A-3332	22S46	S-1X	

SPEAKER

ITEM No.	RATINGS SIZE	RATINGS FIELD	RATINGS V. C. IMP.	GRANCO PART No.	QUAM PART No.	RCA TYPE No.	NOTES
SP1	5" X 7"	PM	3-4Ω	CA-620B-2	57A1	257S1	

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	GRANCO PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	FM Ant. Coil	0Ω		AL477				
L2	RF Choke	.3Ω		AL141	19-1002		4606	
L3	FM RF Coil	0Ω		AL455				
L4	FM Osc. Coil	0Ω		AL456				
L5	Cathode Choke	.3Ω		AL141	19-1002		4606	
L6	AM Loop Stick	.9Ω						
L7	AM Osc. Coil	8.3Ω		BL-574				Tapped @ .5Ω
L8	1st FM IF	1Ω	1Ω	CL472	16-3487	FM-254	1463	
L9	1st AM IF	16Ω	16Ω	BL-576	16-6758	BC-352	12-C1	
L10	2nd FM IF	1Ω	1Ω	CL472	16-3487	FM-254	1463	
L11	2nd AM IF	16Ω	16Ω	BL-576	16-6758	BC-353	12-C2	
L12	Ratio Det.	1.6Ω	.9ΩCT	CL473	17-3498	FM-255	1465	Tertiary winding = .5Ω

SELENIUM RECTIFIER

ITEM No.	RATING CURRENT	GRANCO PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	MALLORY PART No.	RADIO RECEPTOR PART No.	SARKES TARZIAN PART No.	NOTES
M1	.080A	H-100A	1004A	RS100A	6S100	5M4	100	

MISCELLANEOUS

ITEM No.	PART NAME	GRANCO PART No.	NOTES
M2	Tuning Cap.	CC-569-2	2 Gang (11-230MMF, 10-105MMF)
M3	Switch	AO-625	AM-FM (2 Pole - 2 Position, Rotary, Wafer Type)

MOTOROLA
MODELS 66L1, 66L2 (Ch. HS-515, -A)

PROPERTY OF
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DENVER, COLORADO

MOTOROLA
MODELS 66L1, 66L2 (Ch. HS-515, -A)

TRADE NAME	Motorola Models 66L1, 66L2 (Ch. HS-515, HS-515-A)
MANUFACTURER	Motorola Inc., 4545 W. Augusta Blvd., Chicago 51, Ill.
TYPE SET	Three Power Portable AM Superheterodyne Receiver
TUBES (Five)	Types 1T4 RF Amplifier, 1R5 Converter, 1U4 IF Amplifier, 1U5 Det-AVC-AF Amp., 3V4 Output
POWER SUPPLY	110-120 Volts AC-DC (or) 9 Volts "A" Supply & 90 Volts "B" Supply
RATING	.14 Amp. @ 117 Volts AC (or) 50MA @ 9 Volts DC & 9MA @ 90 Volts DC
TUNING RANGE—BROADCAST	535KC - 1620KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use battery power, if possible. If AC power is used, use an isolation transformer when available. If not, connect a .1MFD capacitor in series with low side of the signal generator and B-.
Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Loop should be maintained in same relative position to chassis as when receiver is in cabinet.
To set pointer, turn tuning capacitor fully closed and set pointer to last reference mark at low frequency end of dial.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1MFD	High side to RF stator lug (front section of tuning gang.) Low side to B-.	455KC (400~ Mod)	Tuning gang fully open.	Across voice coil.	A1, A2, A3, A4	Adjust for maximum output. If AC power is used without an isolation transformer, reduce dummy antenna to 200MMF to reduce hum modulation.
2.	"	"	1620KC	"	"	A5	"
3.	"	High side to pin 6 (grid) of 1T4 (V1). Low side to B-.	1400KC	Tune to 1400KC signal.	"	A6	"
4.		Loop	"	"	"	A7	With receiver installed in cabinet, adjust A7 for maximum output.
	The following steps are not necessary except in case of tampering or replacement of antenna, RF or oscillator cores or components.						
5.	.1MFD	High side to RF stator lug on tuning gang. Low side to B-.	1620KC	Tuning gang fully open.	Across voice coil.	A5	Adjust for maximum output.
6.	"	"	535KC	Tuning gang fully closed.	"	A8	Adjust for maximum output. Repeat step 5.
7.	"	High side to pin 6 (grid) of 1T4 (V1). Low side to B-.	1400KC	Tune to 1400KC signal.	"	A6	Adjust for maximum output.
8.	"	"	600KC	Tune to 600KC signal.	"	A9	"
9.		Loop (Radiated)	1400KC	Tune to 1400KC signal.		A7	With receiver installed in cabinet adjust A7 for maximum volume.
10.		"	600KC	Tune to 600KC signal.		A10	With receiver installed in cabinet adjust A10 for maximum volume. Antenna adj. (A10) not in all sets.

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	RF Amplifier	1T4	
V2	Converter	1R5	
V3	IF Amplifier	1U4	

ITEM No.	USE	TYPE	NOTES
V4	Det-AVC-AF Amp.	1U5	
V5	Output	3V4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	MOTOROLA PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	■80	150	23B633167	AFH3-64-65					TVL-3431. 3
B	▲60	150							
C	250	10							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	MOTOROLA PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C2	2000		21K633268	BPD-002	DD-202	K073	801-002	DC522	5HK-D2	
C3	.047	400	8K490232	BPD-05	DF-503	CUB4S47		PT4147	4TM-S47	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	MOTOROLA PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1	1Meg	½	18B635402					Volume & Switch

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	MOTOROLA PART No.	IRC PART No.	
R2	820Ω		6R6269	BTS-820	
R3	2000Ω 5%	6	17B633148		

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	MOTOROLA PART No.	IRC PART No.	
R4	150Ω		65A633275		Note 1

Note 1: Special fuse type resistor unit must be ordered from mfgr.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	MOTOROLA PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	9.7K	3-4Ω	25K633546 ①		A-2998	A-3329	24S49	S-11X	① Part of speaker #50K633443

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	MOTOROLA PART No.	QUAM PART No.	RCA TYPE No.	
SP1	4"	PM	3-4Ω	50K633443 ①	4A07	223S1	① Includes audio output trans. #25K633546.

PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	MOTOROLA PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Loop Stick	.7Ω		1V635677				Note 1
L2	RF Coil	100Ω	6Ω	24B635644				
L3	Input IF	21Ω	21Ω	24K635586				
L4	Output IF	24Ω	24Ω	24K635587				

Note 1: Part #1V635602 used in model 66L2.

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	MOTOROLA PART No.	REPLACEMENT DATA
K1	Mixer-Osc. Circuit	4 Stack Modular Unit	51C635424	
K2	AF Amp-Output Circuit	6 Stack Modular Unit	51C635423	

SELENIUM RECTIFIER

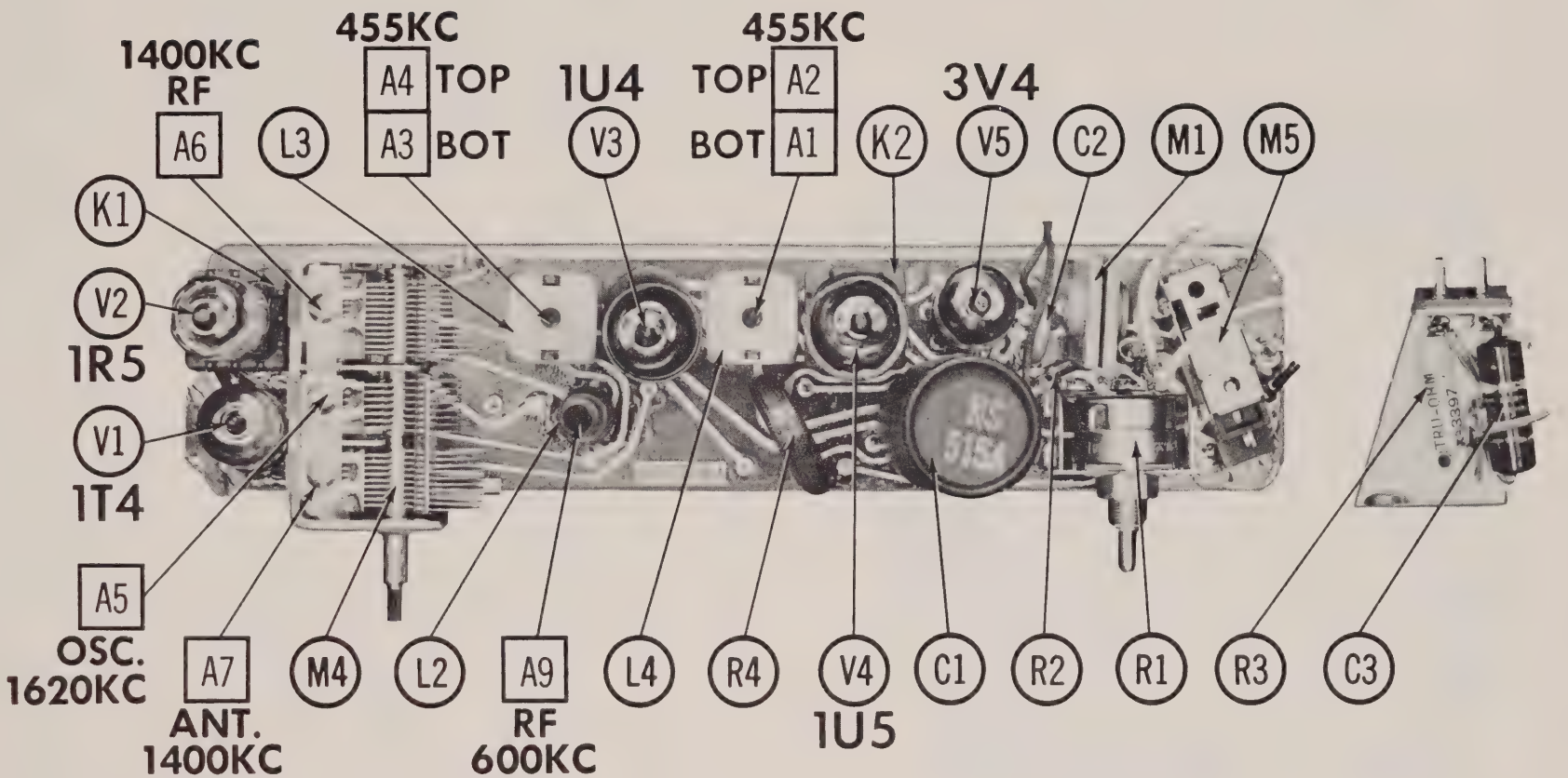
ITEM No.	RATING	REPLACEMENT DATA						NOTES
	CURRENT	MOTOROLA PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	MALLORY PART No.	RADIO RECEPTOR PART No.	SARKES TARZIAN PART No.	
M1	.063A	48K631295	1386	RS065	6S65	5M4	65S	

BATTERIES

ITEM No.	VOLTAGE	MOTOROLA PART No.	REPLACEMENT DATA						INSTALLATION NOTES
			EVEREADY			BURGESS			
			"A"	"B"	"A-B"	"A"	"B"	"A-B"	
M2	9V "A"		276			D6			
M3	90V "B"			479			P60		

MISCELLANEOUS

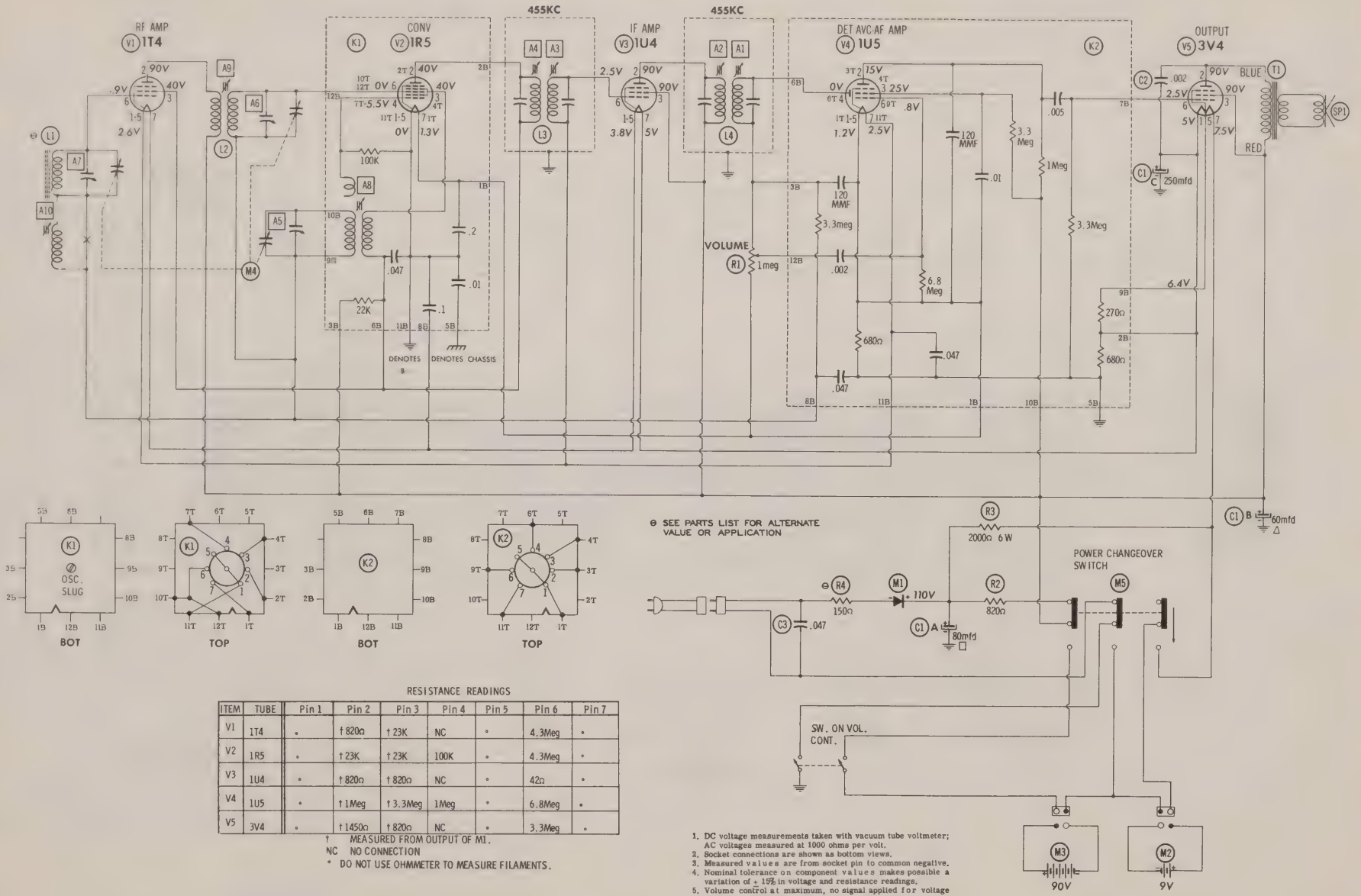
ITEM No.	PART NAME	MOTOROLA PART No.	NOTES
M4	Tuning Cap.	19C635279	3 Gang
M5	Switch	40B635263	Power Changeover (3 Pole -2 Position. Slide Type)
	Cabinet	1V635603	Model 66L1.
	Cabinet	1V635614	Model 66L2.
	Handle Ass'y.	1V635677	Model 66L1.
	Handle Ass'y.	1V635602	Model 66L2.
	Knob	36C635371	Dial
	Knob	36C635401	Tuning, Model 66L1.
	Knob	36K635147	Tuning, Model 66L2.
	Knob	36B635411	On-Off-Volume, Model 66L1.
	Knob	36K635980	On-Off-Volume, Model 66L2.



CHASSIS TOP VIEW

MOTOROLA
MODEL 661.1

SET 338 FOLDER 7



θ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V1	1T4	•	†820Ω	†23K	NC	•	4.3Meg	•
V2	1R5	•	†23K	†23K	100K	•	4.3Meg	•
V3	1U4	•	†820Ω	†820Ω	NC	•	42Ω	•
V4	1U5	•	†1Meg	†3.3Meg	1Meg	•	6.8Meg	•
V5	3V4	•	†1450Ω	†820Ω	NC	•	3.3Meg	•

† MEASURED FROM OUTPUT OF M1.
NC NO CONNECTION
• DO NOT USE OHMMETER TO MEASURE FILAMENTS.

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
5. Volume control at maximum, no signal applied for voltage measurements.

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OLYMPIC MODELS 1CA20, 1CB21, 1DB17, 1KA40, 1TA10, 1TB11, 4CE15 (Ch. CA, CB, CE)

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OLYMPIC MODEL 1TA10 (Ch. "CA")

TRADE NAME	Olympic	MODELS	CHASSIS
		1CA20, 1KA40, 1TA10	"CA"
		1CB21, 1DB17, 1TB11	"CB"
		4CE15	"CE"
MANUFACTURER	Olympic Radio & Television, Inc., 34-01 38th. Ave., Long Island City 1, N.Y.		
TYPE SET	Television Receiver		
TUBES	Fifteen		
POWER SUPPLY	110-120 Volts AC-60 Cycle	RATING 1.4 Amp. @ 117 Volts AC	
TUNING RANGE	Channels 2 thru 13, Video IF 26.25MC, Sound IF 21.75MC (Intercarrier)		

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Tube Placement Chart (Bottom View) 8
Tube Placement Chart (Top View) 5

OLYMPIC MODELS 1CA20, 1CB21, 1DB17, 1KA40, 1TA10, 1TB11, 4CE15 (Ch. CA, CB, CE)

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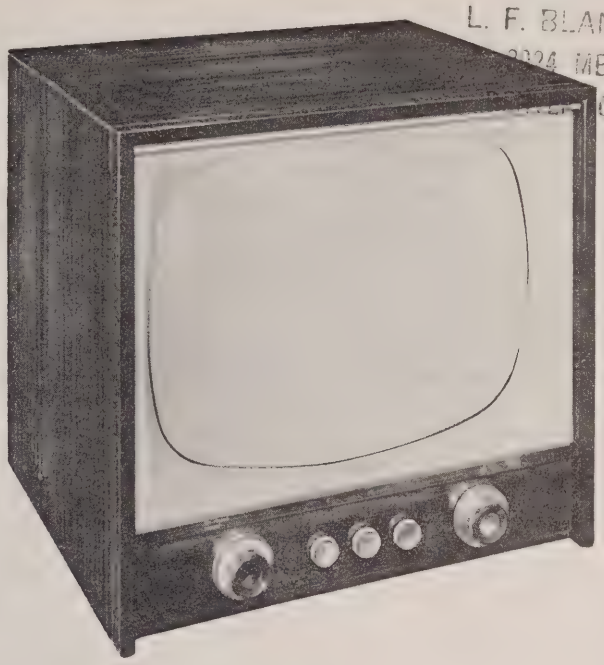
OLYMPIC MODELS 1CA20, 1CB21, 1DB17, 1KA40, 1TA10, 1TB11, 4CE15 (Ch. CA, CB, CE)

PROPERTY OF
L. F. BLANKENSHIP
3324 MEADE ST.
COLORADO



DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

1. Remove 7 push-on type control knobs from front panel of cabinet.
2. Remove 2 metal screws. Remove rear cover.
3. Disconnect speaker plug.
4. Remove 4 chassis bolts. Remove chassis.
5. Remove 2 speaker nuts. Remove speaker.

MODEL	CHASSIS
1TA10	"CA"

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustments of the VHF tuner oscillator circuit may be accomplished by removing the channel selector and fine tuning knobs.

PICTURE TUBE SAFETY GLASS CLEANING

Remove 3 wood screws holding wooden molding at top edge of the safety glass. Remove molding and safety glass. Use extreme caution when removing safety glass.

SERVICE ADJUSTMENT LOCATION

See tube placement chart on page 5.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

The horizontal oscillator may be adjusted from the rear panel of the chassis. Set the horizontal hold control at the center of its range and adjust the horizontal frequency slug (L13) until the picture synchronizes horizontally.

SOUND IF DETECTOR BUZZ ADJUSTMENT

Adjust the buzz control (R7) for maximum volume and minimum buzz.

FUSES

One fuse is used for horizontal sweep circuit protection. (For location see tube placement chart).

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube, located flush against the deflection yoke. Rotate the two rings around the neck of the tube until the picture is properly centered.

OLYMPIC MODELS 1CA20, 1CB21, 1DB17, 1KA40, 1TA10, 1TB11, 4CE15 (Ch. CA, CB, CE)

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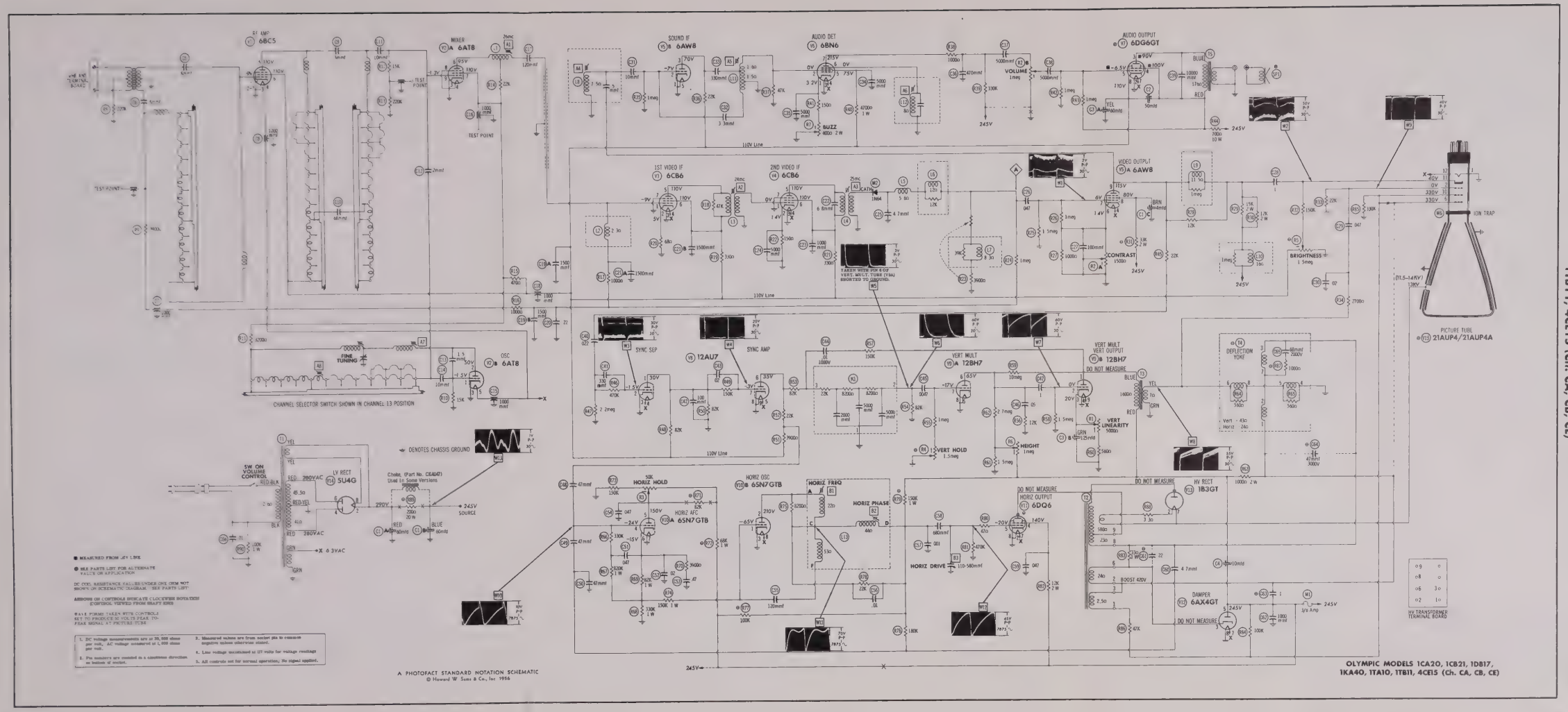
RF AMP V1 6BC5
MIXER V2A 6AT8
SOUND IF V5B 6AW8
AUDIO DET V6 6BN6
AUDIO OUTPUT V7 6DG6GT
1ST VIDEO IF V3 6CB6
2ND VIDEO IF V4 6CB6
VIDEO OUTPUT V5A 6AW8
OSC V2B 6AT8
SYNC SEP V8 12AU7
SYNC AMP
VERT MULT V9A 12BH7
VERT MULT VERT OUTPUT V9B 12BH7
HORIZ OSC V10B 6SN7GTB
HORIZ AFC V10A 6SN7GTB
HORIZ OUTPUT V11 6DQ6
HV RECT V13 1B3GT
DAMPER V12 6AX4GT
LV RECT V14 5U4G
PICTURE TUBE V15 21AUP4/21AUP4A
ION TRAP
BRIGHTNESS 1.5meg
CONTRAST 150Ω
VERT LINEARITY 500Ω
HEIGHT 1meg
VERT HOLD 1.5meg
HORIZ HOLD 50K
HORIZ FREQ
HORIZ PHASE
HORIZ DRIVE 110-580mf
BOOST 420V
VOLUME 1meg
BUZZ 400Ω 2W
FINE TUNING
TEST POINT
CHANNEL SELECTOR SWITCH SHOWN IN CHANNEL 13 POSITION
SW ON VOLUME CONTROL
DENOTES CHASSIS GROUND
245V SOURCE
110V Line
DEFLECTION YOKE
HV TRANSFORMER TERMINAL BOARD
DO NOT MEASURE
TAKEN WITH TOP 6-OZ VERT. MULT. TUBE (V9A) SHORTED TO GROUND.
■ MEASURED FROM -6V LINE
● SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION
DC COIL RESISTANCE FALLS UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM. SEE PARTS LIST
ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)
WAVE FORMS TAKEN WITH CONTROLS SET TO PRODUCE 30 VOLTS PEAK-TO-PEAK SIGNAL AT PICTURE TUBE
1. DC voltage measurements are at 20,000 ohms per volt, AC voltage measured at 1,000 ohms per volt.
2. Pin numbers are counted in a clockwise direction as bottom of socket.
3. Measured values are from socket pin to common negative unless otherwise stated.
4. Line voltage maintained at 117 volts for voltage readings
5. All controls set for normal operation; No signal applied.

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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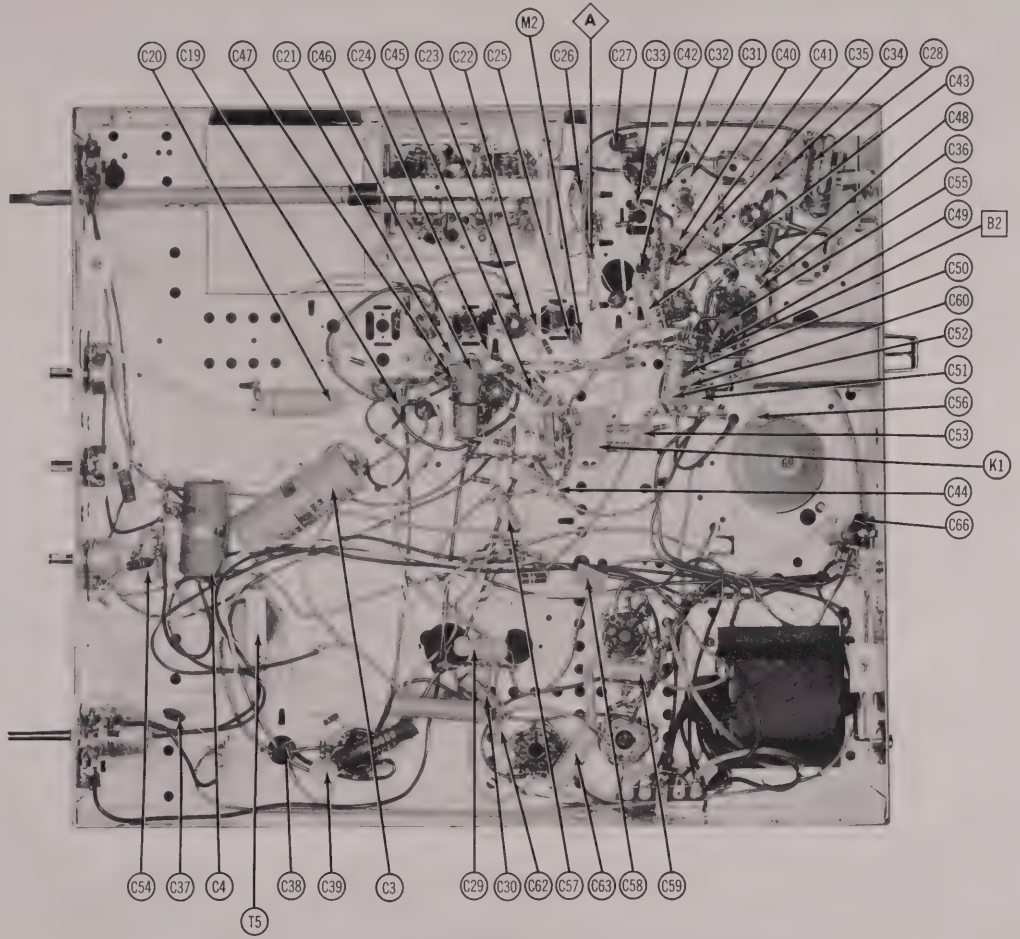
OLYMPIC MODELS 1CA20, 1CB21, 1DB17, 1KA40, 1TA10, 1TB11, 4CE15 (Ch. CA, CB, CE)

OLYMPIC MODELS 1CA20, 1CB21, 1DB17, 1KA40, 1TA10, 1TB11, 4CE15 (Ch. CA, CB, CE)

PROPERTY OF
L. F. [illegible]
3924 MEADE ST.
DENVER, COLORADO



CHASSIS BOTTOM VIEW-CAPACITOR AND ALIGNMENT IDENTIFICATION

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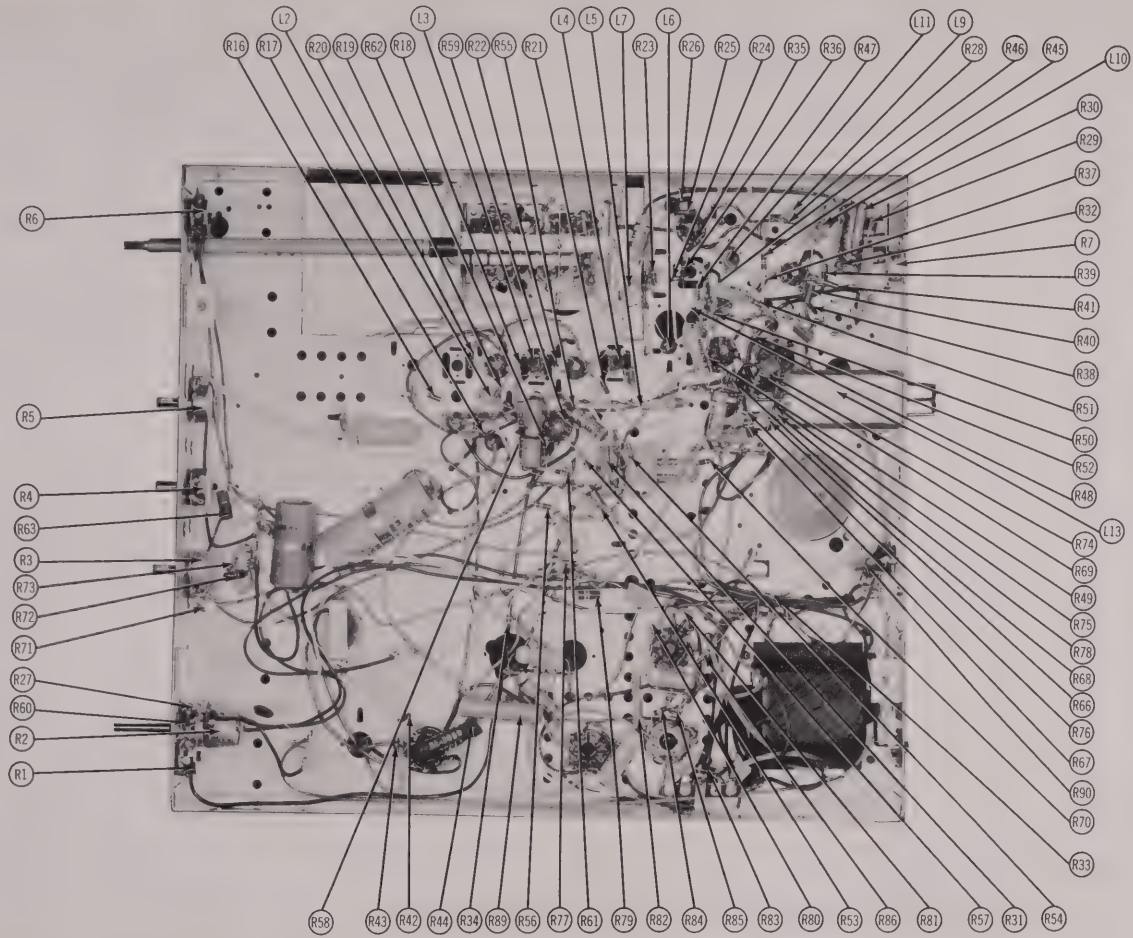
[illegible] MEADE St.,
[illegible] COLORADO



CHASSIS BOTTOM VIEW-RESISTOR AND INDUCTOR IDENTIFICATION

TUBE PLACEMENT CHART

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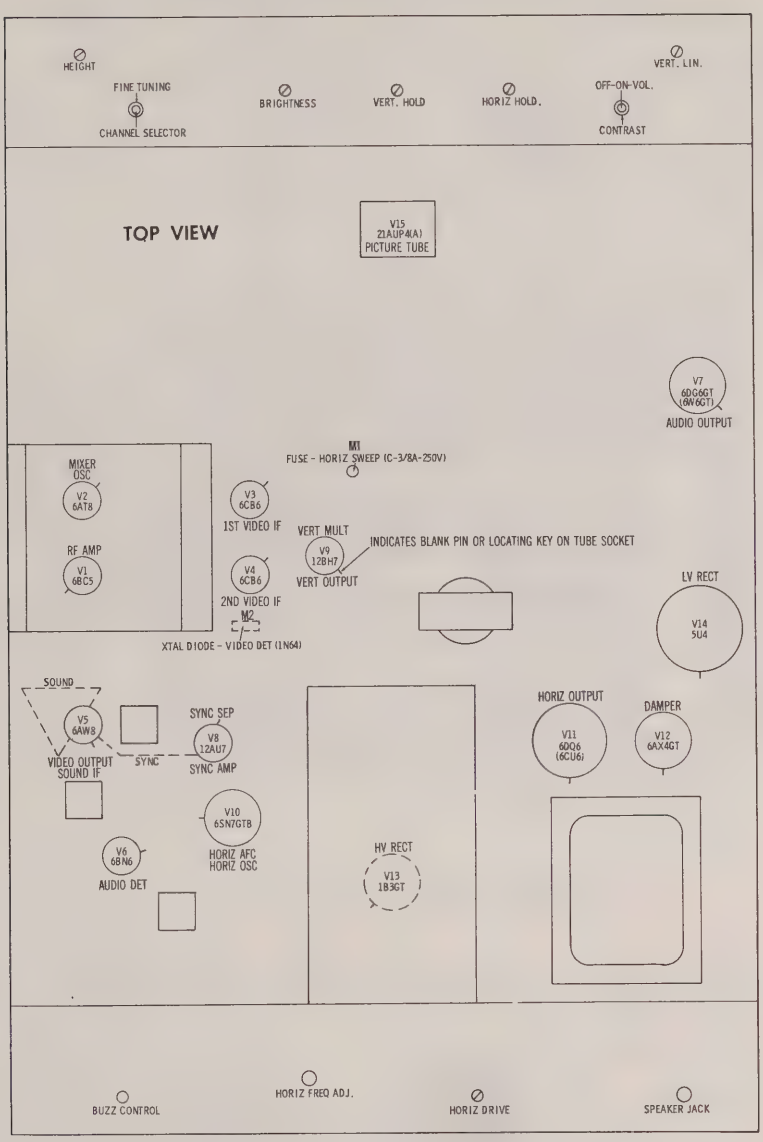


TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - V14

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - V2, V3, V4, V5, V7
No pic, no sound, has snow - V1, V2, V3
No pic, has sound, has raster - V5, V15
Has pic, no sound - V5, V6, V7

SYNC FAILURE
No vert. sync - V8, V9
No horiz. sync - V8, V10
No vert. or horiz. sync - V8

SWEEP FAILURE
No raster, has sound - V10, V11, V12, V13, V15, Fuse (M1)
No vertical deflection - V9
Poor vert. linearity or foldover - V9
Poor horiz. linearity or foldover - V10, V11, V12
Narrow picture - V10, V11, V12, V13, V14
Vert. off freq. - V8, V9
Horiz. off freq. - V8, V10

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage lead should be securely taped and kept away from the chassis. Do not remove the horizontal oscillator tube (V10) to disable the high voltage.

VIDEO IF ALIGNMENT

In step 2 use only enough sweep generator output for usable pattern on scope.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	Direct	High side to an ungrounded tube shield floating over converter tube being careful not to let it touch the grounded shield. Low side to chassis.	Not used	26MC	Any unused channel	Use VTVM. DC probe to point (A). Common to chassis.	A1	Adjust for maximum deflection.
2.	"	"	"	24MC	"	"	A2	"
3.	"	"	"	25MC	"	"	A3	"
4.	"	"	24MC (10MC Swp)	23.75MC 26.25MC	"	Vert. Amp. thru 10K to point (A). Low side to chassis.		Connect the negative lead of a 3 volt battery to the ungrounded side of C20. Connect positive to chassis. Check for response similar to Fig. 1. If necessary, retouch A1 and A2. A1 affects the high frequency side of response curve and A2 affects the low frequency side.

SOUND IF ALIGNMENT USING ON THE AIR SIGNAL

Connect the DC probe of the VTVM to pin 2 of the audio detector tube (V6). Common to chassis. Turn the set on and tune in a strong TV station. Adjust A4 and A5 for maximum deflection on VTVM. Disconnect VTVM from the receiver. Set the buzz control (R7) to its mid-range position and adjust the quadrature coil (A6) for maximum volume. Adjust R7 for maximum volume and minimum buzz. Retouch A4 and A5 for maximum volume.

OSCILLATOR ALIGNMENT

Connect the negative lead of a 3 volt battery to the ungrounded side of C20. Positive lead to chassis.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
5.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	213MC (10MC Swp)	211.25MC 215.75MC	13	Vert. Amp. thru 50K to point (A). Low side to chassis.	A7	Adjust to place sound marker in trap notch as in Fig. 2. Video marker should fall at 50%.
6.	"	"	85MC (10MC Swp)	83.25MC 87.75MC	6	"	A8	"

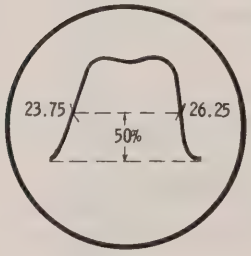


FIG. 1

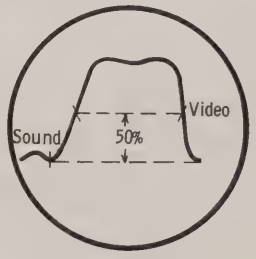
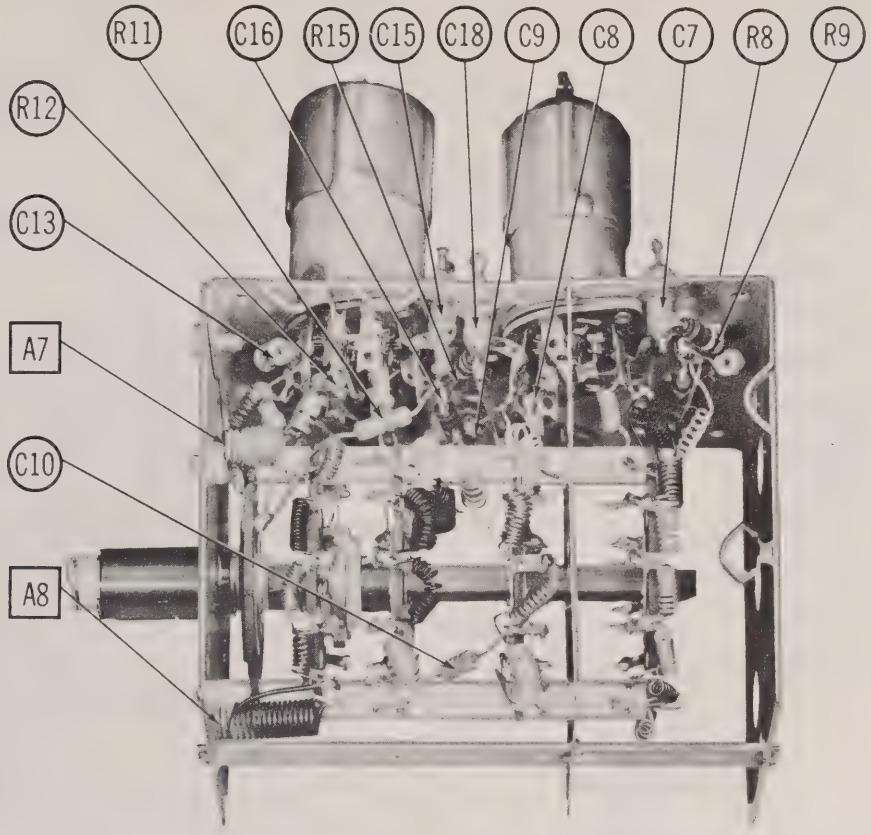
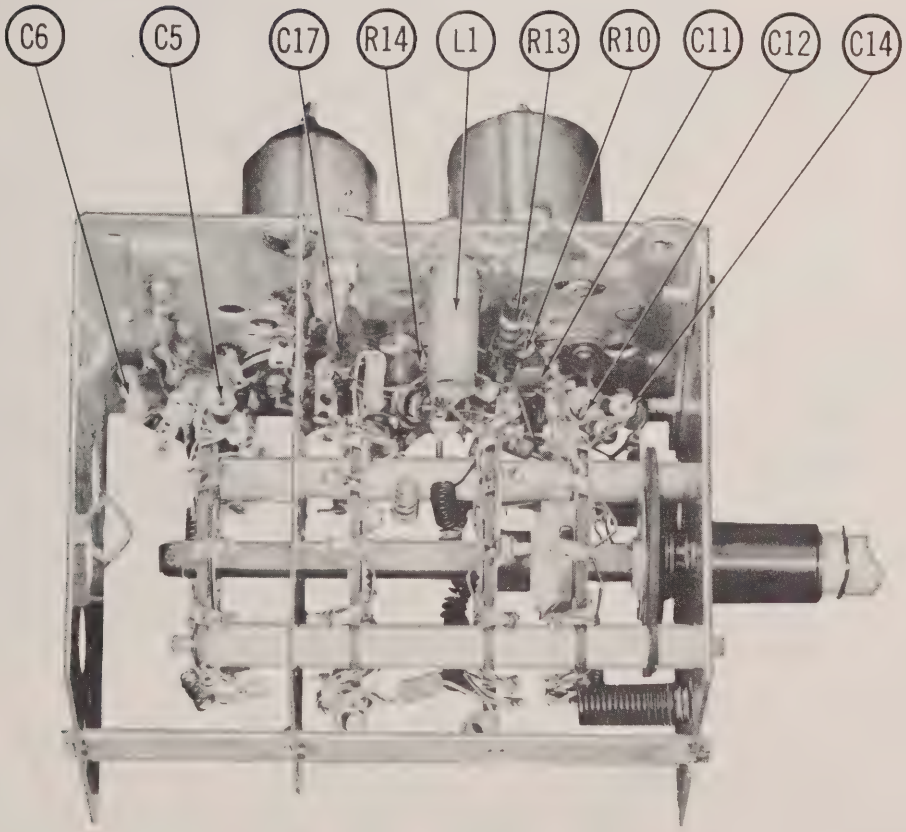


FIG. 2



RF TUNER-RIGHT SIDE

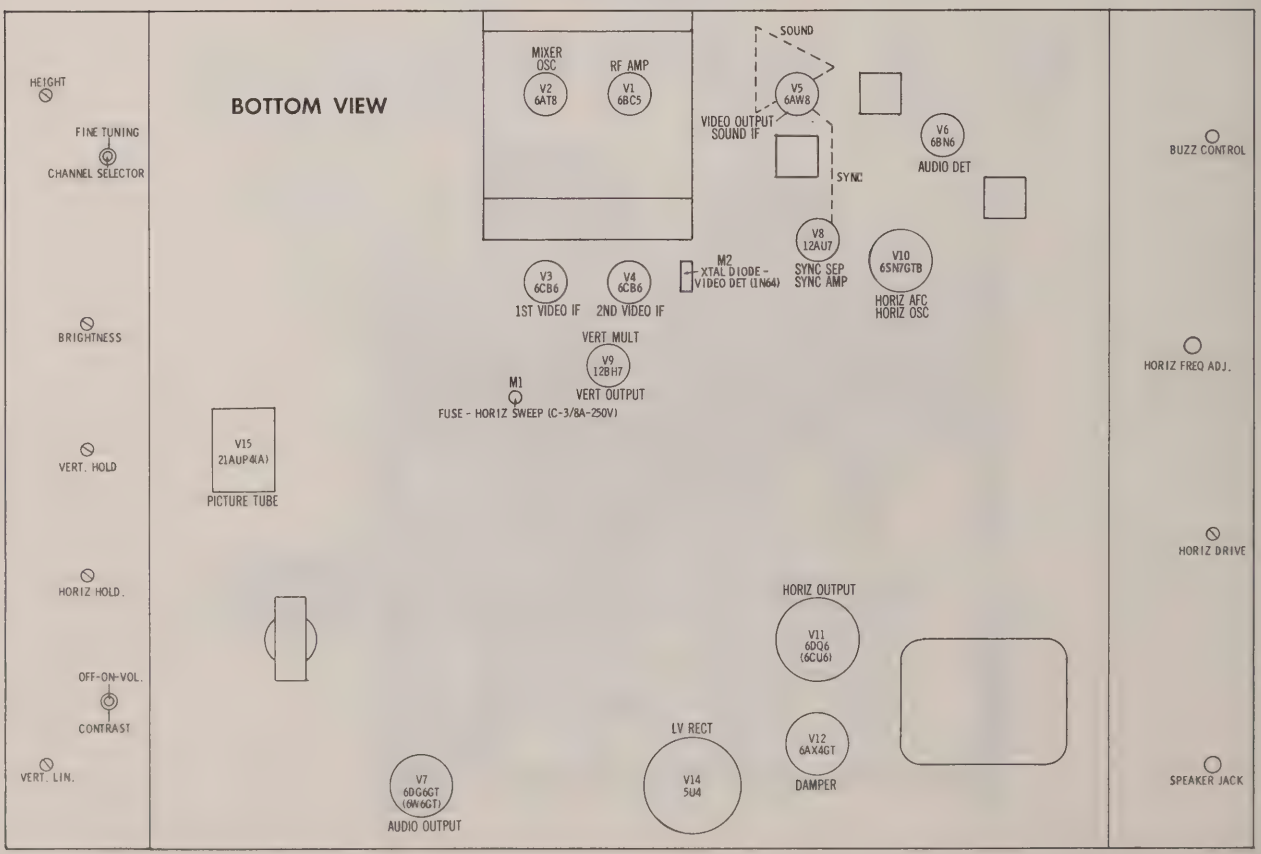


RF TUNER-LEFT SIDE

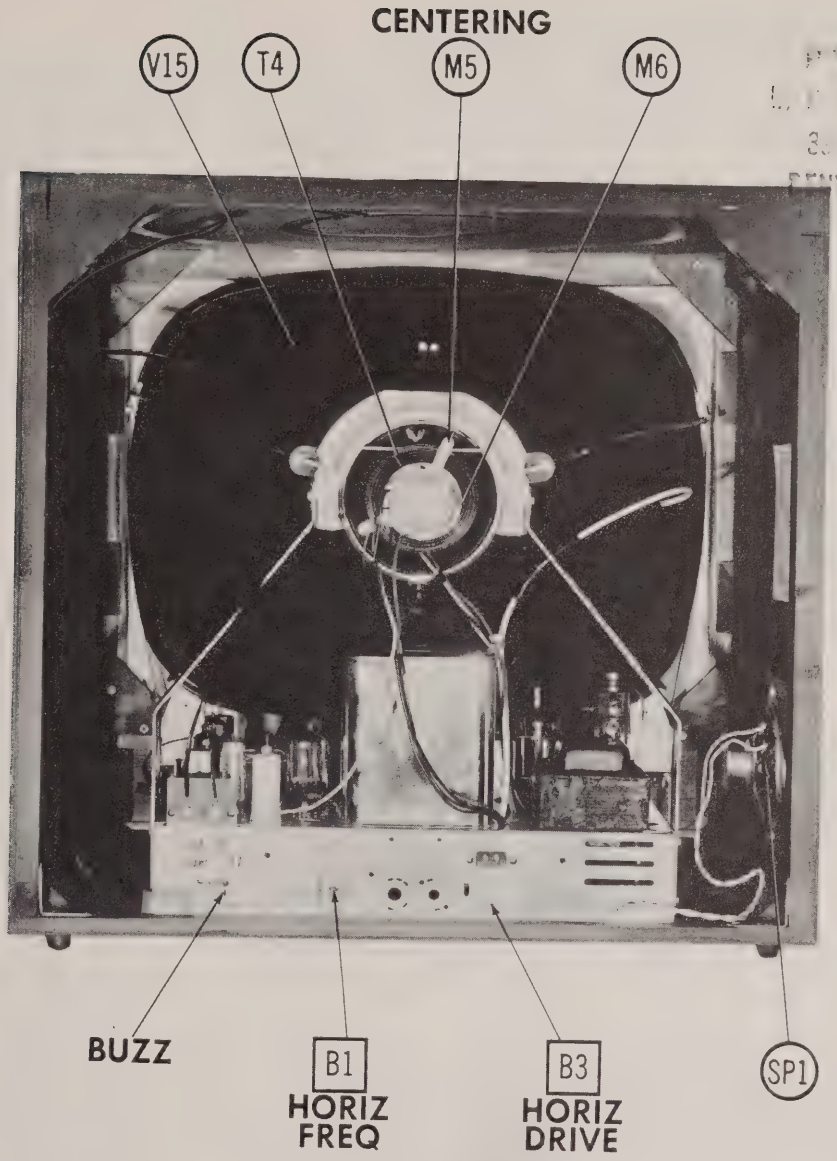
RESISTANCE MEASUREMENTS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	6BC5	1Meg	0Ω	0Ω	.1Ω	■0Ω	■0Ω	0Ω		
V2	6AT8	15K	■8700Ω	0Ω	0Ω	.1Ω	■33K	■470Ω	0Ω	235K
V3	6CB6	1Meg	68Ω	0Ω	.1Ω	■330Ω	■330Ω	0Ω		
V4	6CB6	.3Ω	150Ω	0Ω	.1Ω	■330Ω	■330Ω	0Ω		
V5	6AW8	0Ω	1Meg	■22K	.1Ω	0Ω	●60Ω	600K	†33K	†6500Ω
V6	6BN6	● 350Ω	3.1Ω	0Ω	.1Ω	■4700Ω	8Ω	†330K		
V7	6DG6GT	TP	0Ω	†1000Ω	†900Ω	500K	NC	.1Ω	50K	
V8	12AU7	■50K	2.7Meg	0Ω	.1Ω	.1Ω	■22K	200K	0Ω	0Ω
V9	12BH7	*2600Ω	1.5Meg	●2000Ω	0Ω	0Ω	*2Meg	●1.5Meg	0Ω	.1Ω
V10	6SN7GTB	480K	†70K	0Ω	1.5Meg	†60K	400K	0Ω	.1Ω	
V11	6DQ6	TP	0Ω	NC	†12K	470K	TP	.1Ω	0Ω	TOP CAP *43Ω
V12	6AX4GT	NC	NC	100K	NC	†200Ω	NC	.1Ω	0Ω	
V13	1B3GT		PINS	1 - 8	HAVE	INFINITE	RESISTANCE			TOP CAP *625Ω
V14	5U4G	NC	80K	TP	41Ω	TP	46Ω	NC	80K	
V15	21AUP4	0Ω	22K	Pin 6 *40K	Pin 10 *40K	Pin 11 ● ■300K	Pin 12 .1Ω			

■ MEASURED FROM 110V LINE.
● THIS READING WILL VARY. CONTROL SET FOR NORMAL OPERATION.
* MEASURED FROM PIN 3 OF V12.
† MEASURED FROM PIN 2 OF V14.
TP TIE POINT
NC NO CONNECTION



TUBE PLACEMENT CHART



CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably with a test pattern. Connect a short jumper across terminals "C" and "B" of L13. Set the horizontal hold control fully clockwise. Adjust the horizontal frequency slug (B1) until the picture falls into sync.

Remove the jumper from L13. Connect the vertical amplifier of the scope to terminal "C" of L13 thru a 5MMF capacitor.

Adjust the horizontal phase slug (B2) for a waveform similar to Fig. 3 with broad and narrow peaks of equal amplitude.

If necessary, during the adjustment of B2, keep the picture in sync with the horizontal hold control or B1.

Remove the scope and retouch B1 for the following conditions:

1. At full clockwise position of the horizontal hold control a blanking bar or picture jitter should be visible.

2. At full counter clockwise position of the horizontal hold control the picture should be at the point of losing sync.

Adjust the horizontal drive trimmer (B3) clockwise as far as possible without the presence of vertical white lines or compression near the center of the picture.

If neither of these conditions occur, adjust B3 for a picture slightly wider than necessary to fill the picture mask horizontally.

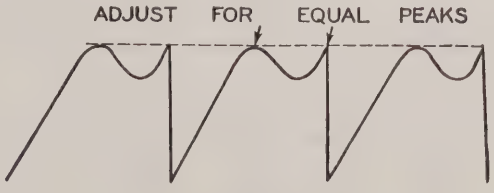


FIG. 3

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No	USE	TYPE	NOTES
V1	RF Amp.	6BC5	
V2	Mixer Osc.	6AT8	
V3	1st Video IF Amp.	6CB6	
V4	2nd Video IF Amp.	6CB6	
V5	Video Output; Sound IF Amp.	6AW8A	
V6	Audio Det.	6BN6	
V7	Audio Output	6DG6GT	Note 1

ITEM No	USE	TYPE	NOTES
V8	Sync Sep. -Sync Amp.	12AU7	
V9	Vert. Mult.-Vert. Output	12BH7	
V10	Horiz. AFC-Horiz. Osc.	6SN7GTB	
V11	Horiz. Output	6DQ6	Note 2
V12	Damper	6AX4GT	
V13	HV Rectifier	1B3GT	
V14	I.F. Rectifier	5U4G	

Note 1: 6W6GT may be used in some versions
Note 2: 6CU6 may be used in some versions.

PICTURE TUBE

ITEM No	REPLACEMENT DATA: OLYMPIC PART No.	RCA PART No.	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	NOTES
V15	21AUP4 or 21AUP4A	21AUP4	21AUP4A ①	① Aluminized ② Silver Screen "85"	
		21AUP4A ①	21AUP4A ②	21AUP4A ②	
	24CP4A	24TP4	24CP4A ①	24CP4A ②	
		24CP4A ①			

ELECTROLYTIC CAPACITORS

ITEM No.	RATING: CAP.	VOLT.	OLYMPIC PART No.	AEROVOX PART No.	CORNELL DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	60	350	CO-3380	PB3-035	BO340	WT480		T-110	R2069*
B	60	350			BR435			MT-4504	
C	4	350							
C2	80	350	CO-3088-1	PBR350V30	BR5025	TC39	TD-80-350	FM-3540	TVA-1713
C3A	80	300	CO-3050	PB3-300	BO578	WD340		D-323	R3064*
B	135	50							
C4	10	450	CO-4033	PBR450V10	BR1045	TC72	TD-10-450	FM-4510	TVA-1705

* Non catalog item.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP	VOLT	OLYMPIC PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C5	8					Z015				
C6	8					Z015				
C7	1000									
C8	1000									
C9	3									
C10	.68				TZ-S68	TZ03	NPO2A-0R68			
C11	10			NP0-D10	TCZ-10	Z018	NP0A-100	ZT-S41	S7CC-QU	
C12	3					Z005				
C13	1.5									
C14	10			NP0-S10	TCZ-10	TZ09	NP0A-100	ZT-S41	S7CC-QU	
C15	1000									
C16	1000									
C17	120			DI-0001Z	DD-121	G044	811-121	UC-5312	5GA-T12	
C18	1000									
C19A	1500		CCD152X	BPD-152005	DD3-152	DK07L	83L-0015	DCD5215	5HK-D15	
B	1500									
C20	33	200	CO-H-3234	PS8AN-33		CUB3P33		PT4033	5TM-P33	
C21A	1500		CCD152X	BPD-152005	DD3-152	DK07L	83L-0015	DCD5215	5HK-D15	Note 4
B	1500									
C22	6.8		CO-4417	NP0-S6.8	TCZ-6R8	Z013	NP0A-6R8	ZT-S68	S7CCB-V68	
C23	1000		CCD102K	BPD-102	DD-102	E049	831-001	UC-5330	5HK-D1	
C24	5000		CCD502X	BPD-502	DD-502	E080	811-005	DC535	5HK-D5	
C25	7		CT-0017	NPO-S6.7	TCZ-6R7	Z017	NP0A-4R7	ZT-S547	S7CCB-Y47	
C26	.047	400	CO-H-4473	BPD-05	DF-503	CUB4S47		PT4747	4TM-S47	
C27	100		CCD101M	DI-0001	DD-101	G043	811-101	UC-5331	5GA-T1	
C28	1	400	CO-H-4014	P4S8H-1	DF-503	CUB4S47		PT4747	4TM-P47	
C29	.047	400	CO-H-4473	BPD-05	DF-503	CUB4S47		PT4747	4TM-S47	
C30	.02	400	CO-H-4303	BPD-03	DF-303	CUB4S3	817-03	PT4743	4TM-S3	
C31	10		CCD100K	NP0-D10	TCZ-10	Z018	NP0A-100	ZT-S41	S7CC-QU	
C32	3.3		CO-3468	NP0-S3.3	TCZ-3R3	TZ08	NP0A-3R3	ZT-S533	S7CCB-V33	
C33	330		CCD331M	DI-0003	DD-331	G046	811-031	UC-5333	5GA-T33	
C34	5000		CCD502X	BPD-005	DD-502	E080	811-005	DC535	5HK-D5	
C35	5000		CCD502X	BPD-005	DD-502	E080	811-005	DC535	5HK-D5	
C36	470		CCD471M	DI-0004??	DD-471	G080	811-471	UC-5347	5GA-T47	
C37	5000		CCD502X	BPD-005	DD-502	E080	811-005	DC535	5HK-D5	
C38	5000		CCD502X	BPD-005	DD-502	K080	811-005	DC535	5HK-D5	
C39	10000		CCD103X	BPD-01	DD-103	E063	811-101	DC531	5HK-S1	
C40	.003	600	CO-H-4303	BPD-002	DF-303	CUB4D3	GPF2-333-302	PT4343	4TM-D3	
C41	330		CCD331M	DK-00033	DD-331	G066	811-331	UC-5333	5GA-T33	
C42	100		CCD101M	DI-0001	DD-101	G043	811-101	UC-531	5GA-T1	
C43	.02	400	CO-H-4303	BPD-03	DF-303	CUB4S3	817-03	PT4743	4TM-S3	
C44	.01	1000	CO-H-3103	P10AW-01	DDH8-103	CUH8B1		PT1801	10TM-S1	
C45	.0047	600	CO-H-4472X	1664-0047		1B3D47			M2-347	
C46	.05	400	CO-H-4503	BPD-05	DF-503	CUB4S5		PT4745	4TM-S5	
C47	1		CO-H-4104	P4S8H-1	DF-104	CUB4P1		PT4741	4TM-P1	
C48	47	500	RCM5C470K	NPO-S47	DD-470	23RS047	831-470	ZT-S447	MS-447	
C49	47	500	RCM5C470K	NPO-S47	DD-470	23RS047	831-470	ZT-S447	MS-447	
C50	47	500	RCM5C470K	NPO-S47	DD-470	23RS047	831-470	ZT-S447	MS-447	
C51	.047	400	CO-H-4473	BPD-05	DF-503	CUB4S47		PT4747	4TM-S47	
C52	.047	400	CO-H-4473	BPD-05	DF-503	CUB4S47		PT4747	4TM-S47	
C53	.47	200	CO-H-3474	P5S8H-47		CUB3P47		PT4047	4TM-P47	
C54	.047	400	CO-H-4473	BPD-05	DF-503	CUB4S47		PT4747	4TM-S47	
C55	120	500	RCM3C121K	NPO-S120	D6-121	22RT121	831-121		MS-312	
C56	01	500	CO-B-4103							
C57	.001	500	CO-C-4102K	1484-001		1R5DA	811-102	MCB255	MS-21	
C58	680	500	RCM3C6A8KM	S1S30	D6-681	5WST68	GP2K-681	UC-5386	1TM-368	
C59	.047	400	CO-H-4473	BPD-05	DF-503	CUB4S47		PT4747	4TM-S47	
C60	4.7		CO-4253	NP0-S14.7	TCZ-4R7	TZ07	NP0A-4R7	ZT-S547	S7CCB-Y47	
C61	33	200	CO-H-3234	P2S8H-33		CUB3P33		PT4033	3TM-P33	Note 1
C62	1000		CCD103X	BPD-001	DD-103	E069	801-001	DC521	5HK-D1	
C63	1	400	CO-H-4104	P4S8H-1	DF-104	CUB4P1		PT4141	4TM-P1	Note 2
C64	47	3000	CO-3625	HVD-30-47	DD30-470	V3Q47	3KV-470	DC30447	30GA-Q47	Note 1
C65	68	2000	CO-4012	HVD-20-68	DD20-680	V3Q68	3KV-680	DC30468	30GA-Q68	
C66	01	600	CO-3103	BPD-01	DH-103	CUB3D1	GP2-333-103	PT631	6TM-D1	

Note 1: Used in CE chassis only.
Note 2: CE chassis uses .33MFD in this application. (part #CO-H-4324).

PARTS LIST AND DESCRIPTIONS
CONTROLS

ITEM No	RATING: RESISTANCE	WATTS	REPLACEMENT DATA: OLYMPIC PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No	MALLORY PART No	INSTALLATION NOTES
R1A	500Ω	1	PT-2R9-1	BX-10	A47-500-S	QU-114	TA58L	Vert. Linearity
B	Shaft		Not Req.	Not Req.	FXE-1/4	BQ	Not Req.	Attach to R1A
R2A	150Ω	½	PT-2T74-1	P1-7	RTV-100	*Q2-404	C1R1SA (	Contrast (Panel)
B	1Meg	½		R3-S3			UR16A) †	Volume (Rear)
C	Switch			R3-1			UR-58	Attach to R2A
R3A	50K		PT-3R7	AB-31	A47-50K-S	QU-113	U36	Horiz. Hold
B	Shaft		Not Req.	AK-4	KRB-3	Not Req.	Not Req.	Attach to R3A
R4A	1.5Meg	½	AB-7143		A47-1.5Meg-S	QU-138	U155	Vert. Hold - Note 1
B	Shaft		Not Req.	AK-4	KRB-3	Not Req.	Not Req.	Attach to R4A
R4A	1Meg	½	PT-3R6-1	AB-89	A47-1Meg-S	QU-137	U54	Vert. Hold
B	Shaft		Not Req.	AK-4	KRB-3	Not Req.	Not Req.	Attach to R4A
R5A	1.5Meg		PT-3R6-1	AB-7143	A47-1.5Meg-S	QU-138	U155	Brightness - Note 1
B	Shaft		Not Req.	AK-4	KRB-3	Not Req.	Not Req.	Attach to R5A
R6A	1Meg	½	PT-3R6	AB-89	A47-1Meg-S	QU-137	U54	Brightness
B	Shaft		Not Req.	AK-4	KRB-3	Not Req.	Not Req.	Attach to R6A
R6A	1Meg	½	PT-3R63-1	BX-89	A47-1Meg-S	QU-137	TA16L	Height
B	Shaft		Not Req.	Not Req.	FXE-1/4	BQ	Not Req.	Attach to R6A
R7	400Ω	2	PT-2R1	39-500			FL-600	Buss (Wire-wound)

* Concentrikit equivalent: K-1 Kit, Base Elements & Shafts; B17-109 & P1-109 (Panel)
B13-137 & R1-128 (Rear)
76-1 (Switch)

† Universal replacement (Mallory exact duplicate part #UE(958)
Note 1: Alternate control used in some versions.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING: OHMS	WATT	REPLACEMENT DATA: OLYMPIC PART No.	IRC PART No.	NOTES
R8	330K			BTS-330K	
R9	3900Ω			BTS-3900	
R10	15K			BTS-15K	
R11	8200Ω			BTS-8200	
R12	15K			BTS-15K	
R13	220K			BTS-220K	
R14	22K			BTS-22K	
R15	470Ω			BTS-470	
R16	1000Ω		REB102M	BTS-1000	
R17	1000Ω		REB102M	BTS-1000	
R18	47K		REB473K	BTS-47K	
R19	330Ω		REB331M	BTS-330	
R20	68Ω		REB68M	BTS-68	
R21	330Ω		REB331M	BTS-330	
R22	150Ω		REB151M	BTS-150	
R23	3900Ω		REB392M	BTS-3900	
R24	1Meg		REB105M	BTS-1Meg	
R25	1.5Meg		REB155M	BTS-1.5Meg	
R26	1Meg		REB105K	BTS-1Meg	
R27	1000Ω		REB102M	BTS-1000	
R28	12K		REB123K	BTS-12K	
R29	15K	2	RED153M	BTS-15K	
R30	12K	2	RED123K	BTS-12K	
R31	33K	2	RED333M	BTS-33K	Note 1
R32	150K		REB154K	BTS-150K	
R33	22K		REB223K	BTS-22K	
R34	2700Ω		REB272K	BTS-2700	
R35	1Meg		REB105M	BTS-1Meg	
R36	22K		REB223M	BTS-22K	
R37	47K		REB473M	BTS-47K	
R38	1000Ω		REB102M	BTS-1000	
R39	330K		REB334K-A	BTS-330K	
R40	4700Ω	1	REC472M	BTA-4700	
R41	150Ω		REB151M	BTS-150	
R42	1Meg		REB105M	BTS-1Meg	
R43	1Meg		REB105K	BTS-1Meg	
R44	700Ω	10	RE2369	1 3/4A-700	
R45	22K		REB223K	BTS-22K	
R46	470K		REB474M	BTS-470K	
R47	2.5Meg		REB255M	BTS-2.5Meg	
R48	82K		REB823K	BTS-82K	
R49	150K		REB154K	BTS-150K	

ITEM No.	RATING: OHMS	WATT	REPLACEMENT DATA: OLYMPIC PART No.	IRC PART No.	NOTES
R50	82K		REB823K	BTS-82K	
R51	3900Ω		REB392K	BTS-3900	
R52	22K		REB223K	BTS-22K	
R53	82K 5%		REB823K	BTS-82K 5%	
R54	82K 5%		REB823K	BTS-82K 5%	
R55	1Meg		REB105K	BTS-1Meg	
R56	12K		REB123K	BTS-12K	
R57	470		REB154K-A	BTS-150K	
R58	1.5Meg		REB155K	BTS-1.5Meg	
R59	10Meg		REB106K	BTS-10Meg	
R60	560Ω		REB561K	BTS-560	
R61	1.5Meg		REB155K	BTS-1.5Meg	
R62	2.7Meg		REB275K	BTS-2.7Meg	
R63	1000Ω	2	RED102M	BTS-1000	
R64	560Ω		REB561K		
R65	560Ω		REB561K		
R66	330K		RK334K-A		
R67	820K	1	REC824K-A		
R68	330K 5%	1	REC334J-A		
R69	82K 5%	1	REC823J-A		
R70	3900Ω		REB392K		
R71	82K		REB823K	BTS-82K	Note 2
R72	68K		REC683K-A		Note 3
R73	150K		REB154K-A	BTS-150K	
R74	180K 5%	1	REC184J-A		
R75	6200Ω		RK622K		
R76	180K		REB184K-A		
R77	100K		REB104K-A		
R78	22K		REB223K	BTS-22K	Note 4
R79	150K	1	REC154K-A		
R80	47Ω		REB470M	BTS-47	
R81	470K		REB474M	BTS-470K	
R82	12K	2	RED123K	BTS-12K	
R83	33Ω	1	REC330M		
R84	100K		REB104K-A		
R85	330K		REB334K-A		
R86	47K		REB473M	BTS-47K	
R87	10000Ω		REB103K		Note 6
R88	2.2Ω		RE4418	BW-1, 3	
R89	2000Ω	20	RE3569	3D-300	Note 7
R90	100K	1	REC104M	BTA-100K	

Note 1: In chassis CE 47K 2W is used in this application. (Part #RED473M)
Note 2: Not used in some versions.
Note 3: In chassis CE 47K 1W is used in this application. (part #REC472K-A)
Note 4: In chassis CE 150K is used in this application. (part #REB154K-A)
Note 5: In chassis CE 100K 1W is used in this application. (part #REC104K-A)
Note 6:Some versions use a 27000 in this application. (part #REB272K)
Note 7: Not used in chassis CE.

TRANSFORMER (POWER)

ITEM No	RATING: PRI.	SEC. 1	SEC. 2	SEC. 3	REPLACEMENT DATA: OLYMPIC PART No	Halldorson PART No	Merit PART No	Stancor PART No	Thordarson PART No	Triad PART No
T1	117VAC	550VCT	5V	6.3V	TR4007	P9735 ①	P-8256 ②	P-8164 ②	26R193 ①②	R-61BC ①②
	234VAC	2.15A	② 3A	2.7.8A	TR3621-1	P9733 ①	P-8256 ②	P-8164 ②		①

① Drill new mounting holes.
② Tape 5, 2.7, 1.5A winding.
③ Parallel and phase 6.3V, 6A windings.
④ Tape low HV winding. Tape 5V, 3A winding parallel and phase 6.3V, 5A windings.

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No	USE	REPLACEMENT DATA: OLYMPIC PART No	Halldorson PART No	Merit PART No	RCA TYPE No	Ram PART No	Stancor PART No	Thordarson PART No	Triad PART No
T2	Horiz. Output Trans.	TR3593-2	FB41*4 ①	HVS-0*5	225T1*2 ①	X080*1 ①	A-8252*5 ①	25LY-14*8 ①	U-19*8 ①
T3	Vert. Output Trans.	TR3589	Z1900 ②	A-3050 ②	226T1 ①	V312 L ②	A-8161 ②	29R54 ①	A-104X ②
T4A	Yoke(70°)Horiz(9.5MH	CL3847 ③	DF605 ③	MDF-73 ③	222H ③	Y70F20/43 ③	DY-14A ③	Y-10 ③	Y-22-1 ③
B	Yoke (53MH)								
T4A	Yoke(90°)Horiz(8.5MH	CL3600 ③	DF607 ③	MDF-92	235D1 ③	Y80F10/43 ③	DY-16A	Y-16 ③	Y-41-1
B	Vert. (41MH)								

① Drill new mounting hole(s).
② Use 18 to 1 turns ratio.
③ Connect blue lead to plate (pin 8) of V9. Connect red lead of trans. to yellow lead of yoke. Remove green lead of yoke from ground and connect it and green lead of trans. to junction of capacitor C4; and resistors R8, R63 and R79.
④ Used in chassis CA and CB.
⑤ Used in chassis CE only.
⑥ Connect horiz. yoke damping network across terms #3 and #7. Use original if necessary.
⑦ Remove capacitor from terms #1 and #3.
† This part may be superceded by parts manufacturer's introduction of special unit for this application.

TRANSFORMER (AUDIO OUTPUT)

ITEM No	IMPEDANCE: PRI	SEC	OLYMPIC PART No	Halldorson PART No	Merit PART No	Stancor PART No	Thordarson PART No	Triad PART No	NOTES
T5	2.4K	3-4Ω	TR3788-1	22101	A-3035	A-3533	26R58 ①	S-13X	① Drill one new mounting hole.

SPEAKER

ITEM No.	RATINGS: SIZE	FIELD	V C IMP	REPLACEMENT DATA: OLYMPIC PART No.	QUAM PART No.	RCA TYPE No	NOTES
SP1	4"	PM	3-4Ω	SK4342 ①	4A07	22381	① Used in models ITA10 and ITB1L.
	5	PM	3-4Ω	SK3768-2 ②	5A07	20982	② Used in models ICA20, ICB20, IDB17 & 4CE15.
	8	PM	3-4Ω	SK3906-3 ③	8A2I	23481	③ Used in model 1KA40.

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: OLYMPIC PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	1st Video IF	.45CT						
L2	RF Choke	2.3Ω		CL1525	19-3230	TV-120	6176	36 Microhenries
L3	2nd Video IF	.3Ω	.3Ω	CL4413	17-1053	TV-118	6319	
L4	3rd Video IF	.3Ω	.3Ω	CL4413	17-1064	TV-118	6319	
L5	Series Peaking Coil	5.6Ω		CK6415				5.6 Microhenries, IRC part #CL-L
L6	Series Peaking Coil	19Ω		CL1556	19-3160*	TV-136*	6180*	180 Microhenries; Wound on 12K resistor.
L7	Shunt Peaking Coil	8.3Ω		CL1537	19-4180	TV-123	6179	180 Microhenries; Wound on 39K resistor.
L8	4.5MC Trap	7.5Ω		CL3614				
L9	Series Peaking Coil	11.5Ω		CL3403	19-3300*	TV-150*	6185*	300 Microhenries; Wound on 1Meg resistor.
L10	Shunt Peaking Coil	15Ω		CL3624	19-3500*	TV-138	6174*	500 Microhenries; Wound on 1Meg resistor. Tap ③ - 5Ω and L 5Ω
L11	Sound IF	3.6Ω		CL4021	17-1413			
L12	Quadrature Coil	8Ω		CL3603-1		1481		

* Parallel with 12K resistor.
* Parallel with 1Meg resistor.

TRANSFORMER (HORIZ. OSC.)

ITEM No.	DC RES: PRI.	SEC.	REPLACEMENT DATA: OLYMPIC PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	RCA TYPE No.	Ram PART No.	Thordarson PART No.	NOTES
L13	22Ω	55Ω	TR3254	30-1602*	TV-162*	6183*	305R1*	E-100*	RH-3*	Waveform winding 44Ω

* Reverse coil mounting in can.

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	OLYMPIC PART No.	REPLACEMENT DATA
K1	Vertical Integrator	22K, 8200Ω, 8200Ω, 3000MMF, 5000MMF, 5000MMF.	PC3435	Aerovox PA-110 Centralab SPC-100 Cornell-Dubilier 15TM1 Erie 1605-01 Sprague V-1

PARTS LIST AND DESCRIPTIONS (Continued)

FUSES

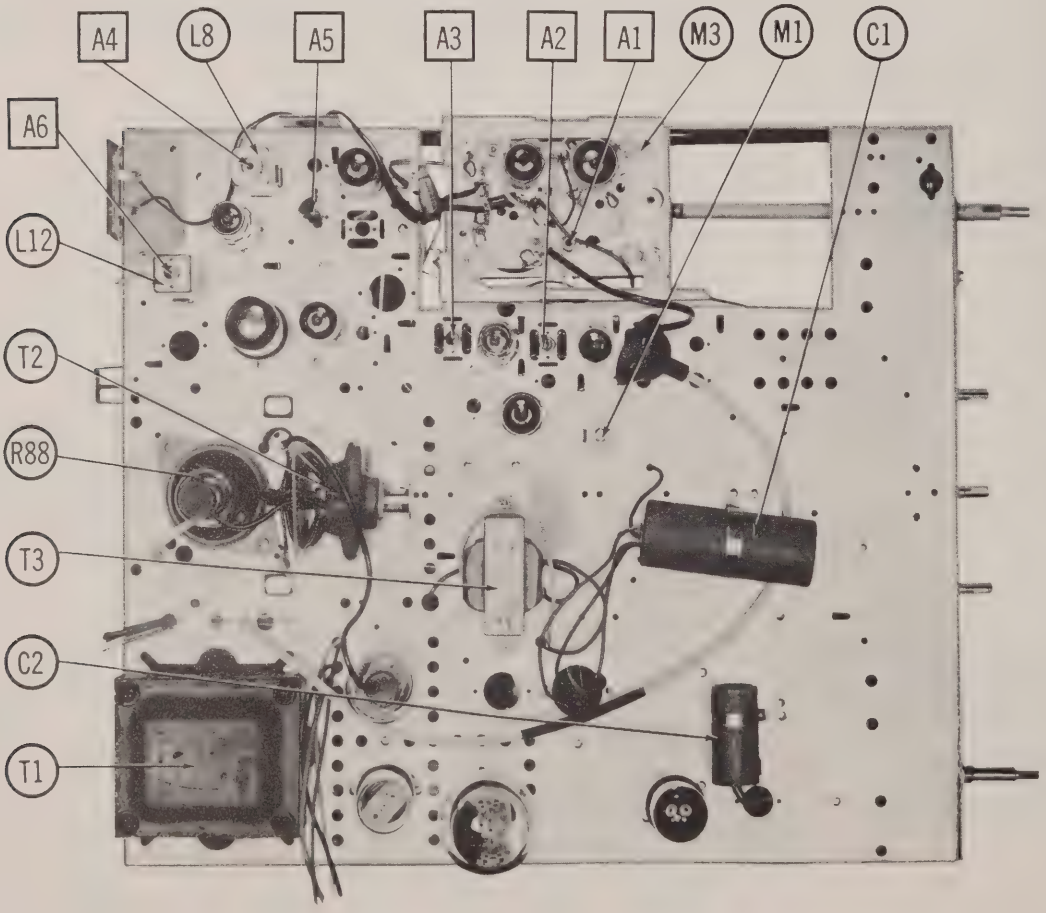
ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			OLYMPIC PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M1	C	3/8A 250V	FU4345	FH4344	332.375 (C - 3/8A)	346002	C 3/8	HC 3/10 to 1/2

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA		NOTES
		OLYMPIC PART No.	SYLVANIA PART No.	
M2	1N64	1N64	1N60	Video Det. (Pigtail)

MISCELLANEOUS

ITEM No.	PART NAME	OLYMPIC PART No.	NOTES
M3	Tuner	CL4306	Pentode - Chassis CA & CE
	Tuner	CL4307	Cascode - Chassis CB
M4	Focus Magnet	PP4418	Includes Centering Device - Chassis CE only.
M5	Centering Device	PP2763	Chassis CA & CB
M6	Ion Trap	PP2623	Chassis CA & CB
	Ion Trap	PP2248	Chassis CE only.
B3	Trimmer Cap.	CT3526	Horiz. Drive (110-580MMF)
	Cabinet	CA4327	Models 1TA10, 1TB11
	Cabinet	CA4332	Model 1KA40
	Cabinet	CA4341	Models 1CA20, 1CB21
	Cabinet	CA4327	Model 4CE15
	Cabinet	CA4502	Model 1DB17
	Knob	KN3902-1	Fine Tuning
	Knob	KN3903-1	Picture
	Knob	KN4406	Channel Selector (Mahogany)
	Knob	KN4406-1	Channel Selector (Tan)
	Knob	KN4407	Control (3 used)
	Knob	KN4408	On-Off-Volume (Mahogany)
	Knob	KN4408-1	On-Off-Volume (Tan)
	Mask	PP3646-1	Models 1TA10, 1CA20
	Mask	PP3646-2	Models 1KA40, 1CB21, 1DB17, 1TB11
	Mask	PP3938	Model 4CE15
	Safety Glass	PP3939	Model 4CE15
	Safety Glass	PP3656-1	Models 1CB21, 1DB17, 1TB11
	Safety Glass	PP3656	Models 1TA10, 1CA20, 1KA40



CHASSIS TOP VIEW

PROPERTY OF
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3324 MEADE ST.
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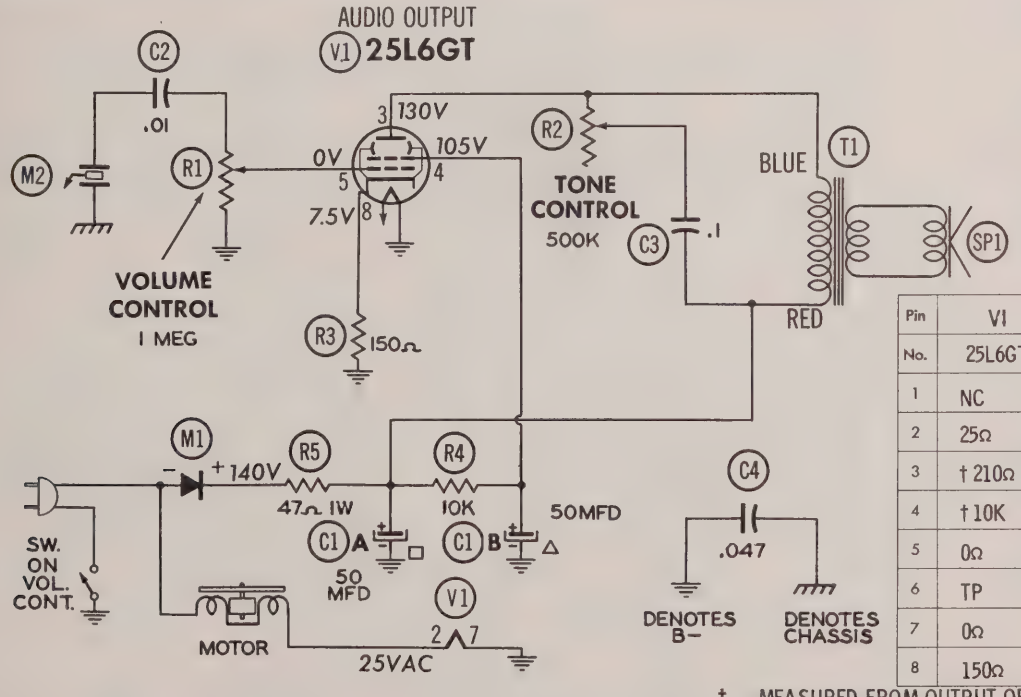
RCA VICTOR MODELS
6-EMP-2A, B, 7-EMP-2 (Ch. RS-153)

TRADE NAME	RCA Victor Models 6-EMP-2A, 6-EMP-2B, 7-EMP-2 (Ch. RS-153)
MANUFACTURER	RCA Victor Radio & "Victrola" Div., Radio Corp. of America, Camden 2, N.J.
TYPE SET	AC Operated Phono Amplifier With 3 Speed Manual Record Player
TUBES (One)	Type 25L6GT Output
POWER SUPPLY	110-120 Volts AC-60 Cycles RATING .34 Amp. @ 117 Volts AC



Pin No.	V1 25L6GT
1	NC
2	25Ω
3	† 210Ω
4	† 10K
5	0Ω
6	TP
7	0Ω
8	150Ω

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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† MEASURED FROM OUTPUT OF M1.
NC NO CONNECTION.
TP TIE POINT.

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PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Output	25L6GT	

ITEM No.	USE	TYPE	NOTES

ELECTROLYTIC CAPACITORS

ITEM No	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	RCA Victor PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	■50	150	101386	AFH2-16	XB003	FP214	TMD-13	D-070	TVL-2435
B	▲50	150							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	RCA Victor PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C2	.01	200	101000	BPD-01	DD-103	CUB4S1	811-01	PT411	4TM-S1	
C3	.1	200	73784	P288N-1	DF-104	CUB2P1		PT401	2TM-P1	
C4	.047	600	73592	BPD-05	DF-503	CUB6S47		PT6147	6TM-S47	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	RCA Victor PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	1Meg	½	101383	B-70-S	A47-1Meg-Z	Q13-137	U-53	Volume
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R1A
C	Switch		Not Req.	Not Req.	SWE-12	76-1	US-26	Attach to R1A
R2A	500K	½	101384	B-60	A47-500K-Z	Q13-133	U-48	Tone
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R2A

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	RCA Victor PART No.	IRC PART No.	
R3	150Ω			BTS-150	
R4	10K			BTS-10K	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	RCA Victor PART No.	IRC PART No.	
R5	47Ω	1		BTA-47	

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	RCA Victor PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	2700Ω	3-4Ω	77993	Z1101 ①	A-3025①	A-3332 ①	26S58 ①	S-12X①	① Bend ears down over bracket.

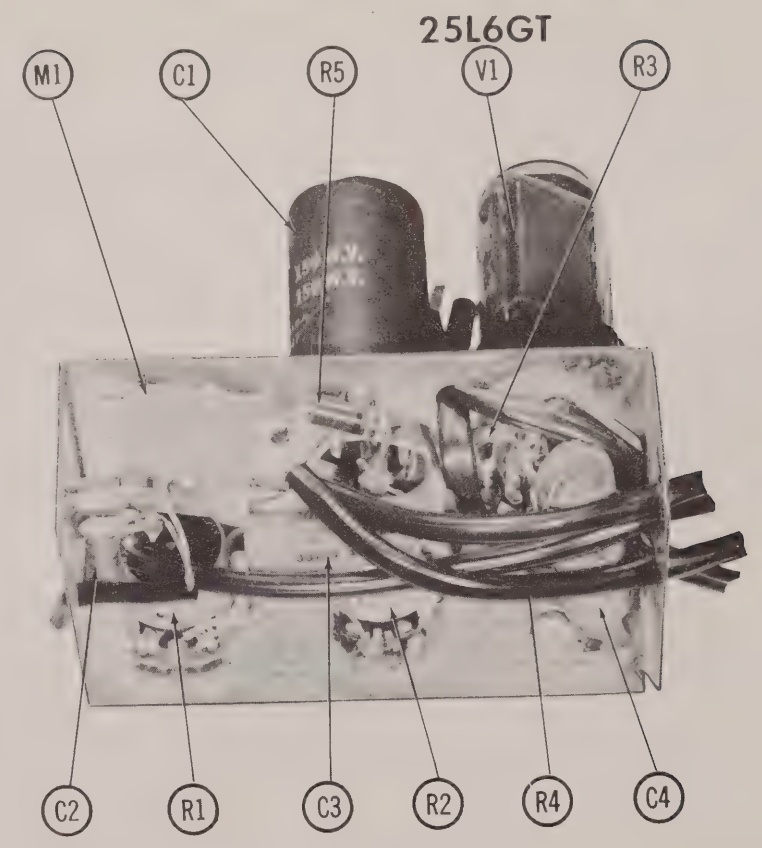
SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	RCA Victor PART No.	QUAM PART No.	RCA TYPE No.	
SP1	4"	PM	3-4Ω	79696	4A07	22381	

SELENIUM RECTIFIER

ITEM No.	RATING	REPLACEMENT DATA						NOTES
	CURRENT	RCA Victor PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	MALLORY PART No.	RADIO RECEPTOR PART No.	SARKES TARZIAN PART No.	
M1	.048A	77958	1003A	RS075	6S75	5M4	75	

CHASSIS—BOTTOM VIEW



PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA					REMARKS
	RCA Victor PART No.	ASTATIC PART No.		ELECTRO-VOICE PART No.		
		CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	
M2	101316	66-TY *P-66-T	K & K-78			* Complete tone arm and cartridge assembly

ASTATIC NEEDLE LISTINGS SHOWN ABOVE ARE SPECIFIED FOR THE RESPECTIVE REPLACEMENT CARTRIDGES LISTED. FOR ORIGINAL CARTRIDGE NEEDLE REPLACEMENTS SEE BELOW.

PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA				REMARKS
	RCA Victor PART No.	FIDELITONE PART No.	JENSEN PART No.	WALCO PART No.	
M3	101318 (78 needle)	*C-164	*A-76 or †A-67 or ♦A-67D	*W-39A	* Metal † Jewel ♦ Diamond
	101317 (33 1/3 -45 needle)	*A-162	*A-76LP or †A-67LP or ♦A-67LPD	*W-39MGA	

PHOTOFACT* Folder

*TRADE MARK

RETMA MEMBER

TRAV-LER MODELS 517-106, -107, 521-111, -112 (Ch. 520A5)

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TRAV-LER MODELS 517-106, -107, 521-111, -112 (Ch. 520A5)

TRAV-LER MODEL 521-111

TRADE NAME	Trav-Ler Models 517-106, 517-107, 521-111, 521-112 (Ch. 520A5)
MANUFACTURER	Trav-Ler Radio & Television Corp., 571 W. Jackson Blvd,, Chicago 6, Illinois
TYPE SET	Television Receiver
TUBES	Thirteen
POWER SUPPLY	110-120 Volts AC-60 Cycles RATING 1.1 Amp. @ 117 Volts AC
TUNING RANGE	Channels 2 thru 13, Video IF 26.25MC, Sound IF 21.75MC (Intercarrier)

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DATE 11-56 SET 338 FOLDER 10

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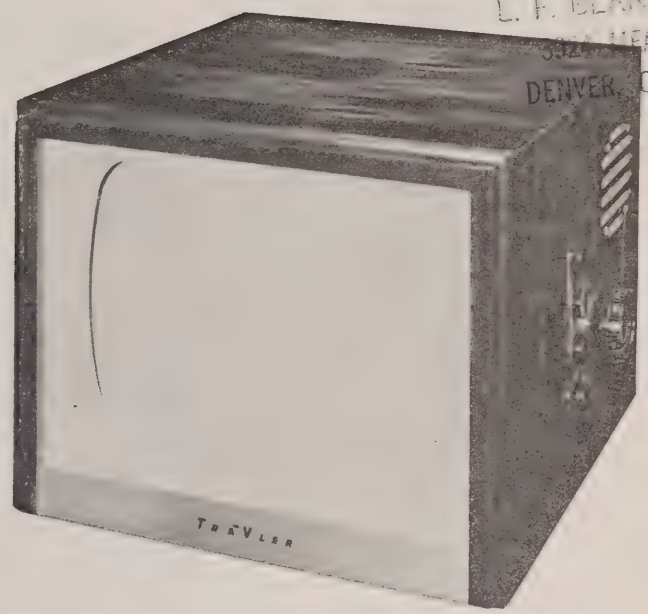

DISASSEMBLY INSTRUCTIONS

CABINET REMOVAL

1. Remove 6 push-on type control knobs from side panel of cabinet.

2. Remove 2 wood screws and 1 metal screw . Remove rear cover.

3. Disconnect picture tube socket, yoke plug, HV lead, ground strap and speaker leads.

4. Remove 3 chassis bolts. Remove chassis.

5. Remove 4 speaker nuts. Remove speaker.

MODEL	CHASSIS
521-111	520A5

TRAV-LER MODELS 517-106, -107, 521-111, -112 (Ch. 520A5)

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustments of the VHF tuner oscillator circuit may be accomplished by removing the channel selector and fine tuning knobs.

PICTURE TUBE SAFETY GLASS CLEANING

For picture tube safety glass cleaning, it is necessary to remove chassis. (See disassembly instructions).

SERVICE ADJUSTMENT LOCATION

See tube placement chart on page 5.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

To adjust the horizontal oscillator, it is necessary to remove the rear cover and supply power to the set. Set the horizontal hold control at the center of its range and adjust the horizontal frequency coil (L12) until the picture synchronizes horizontally.

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate sound IF detector buzz, adjust the ratio detector secondary (L11) located on top of the chassis.

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube, located flush against the deflection yoke. Rotate the two rings around the neck of the tube until the picture is properly centered.

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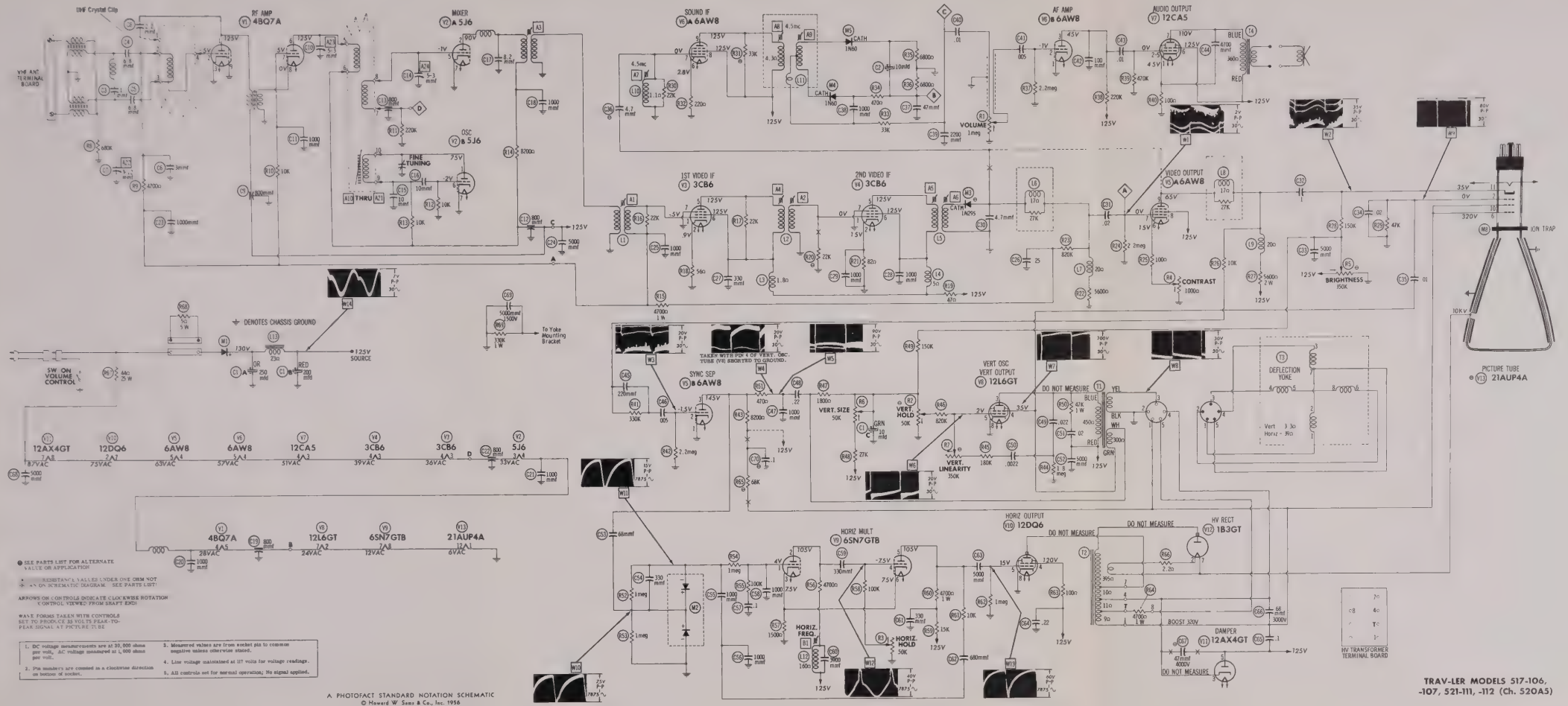
RF AMP V1 4BQ7A
MIXER V2A 5J6
OSC V2B 5J6
SOUND IF V6A 6AW8
AF AMP V6B 6AW8
AUDIO OUTPUT V7 12CA5
1ST VIDEO IF V3 3CB6
2ND VIDEO IF V4 3CB6
VIDEO OUTPUT V5A 6AW8
SYNC SEP V5B 6AW8
VERT OSC VERT OUTPUT V6 12L6GT
HORIZ MULT V9 6SN7GTB
HORIZ OUTPUT V10 12DQ6
HV RECT V12 1B3GT
DAMPER V11 12AX4GT
PICTURE TUBE V13 21AUP4A
ION TRAP
DEFLECTION YOKE
VOLUME
CONTRAST
BRIGHTNESS
VERT. SIZE
VERT. HOLD
VERT. LINEARITY
HORIZ. FREQ.
HORIZ. HOLD
FINE TUNING
BOOST 320V
DO NOT MEASURE
DENOTES CHASSIS GROUND
SW ON VOLUME CONTROL
125V SOURCE
To Yoke Mounting Bracket
TAKEN WITH FOR 4 CP VERT. OSC. TUBE (V6) SHORTED TO GROUND.
V1 12AX4GT 1A8 87VAC
V10 12DQ6 2A7 75VAC
V5 6AW8 5A4 63VAC
V6 6AW8 5A4 57VAC
V7 12CA5 5A3 51VAC
V4 3CB6 4A3 39VAC
V3 3CB6 4A3 36VAC
V2 5J6 3A4 33VAC
V1 4BQ7A 4A5 28VAC
V8 12L6GT 7A2 24VAC
V9 6SN7GTB 7A8 12VAC
V13 21AUP4A 12A1 6VAC
UHF Crystal Clip
VHF ANT. TERMINAL BOARD
HV TRANSFORMER TERMINAL BOARD
SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION
ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION OF CONTROL VIEWED FROM SHAFT END
WAVE FORMS TAKEN WITH CONTROLS SET TO PRODUCE 85 VOLTS PEAK-TO-PEAK SIGNAL AT PICTURE TUBE
1. DC voltage measurements are at 20,000 ohms per volt, AC voltage measured at 4,000 ohms per volt.
2. Pin numbers are counted in a clockwise direction as bottom of socket.
3. Measured values are from socket pin to common negative unless otherwise stated.
4. Line voltage maintained at 117 volts for voltage readings.
5. All controls set for normal operation, No signal applied.

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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TRAV-LER MODELS 517-106, -107, 521-111, -112 (Ch. 520A5)

TRAV-LER MODELS 517-106, -107, 521-111, -112 (Ch. 520A5)

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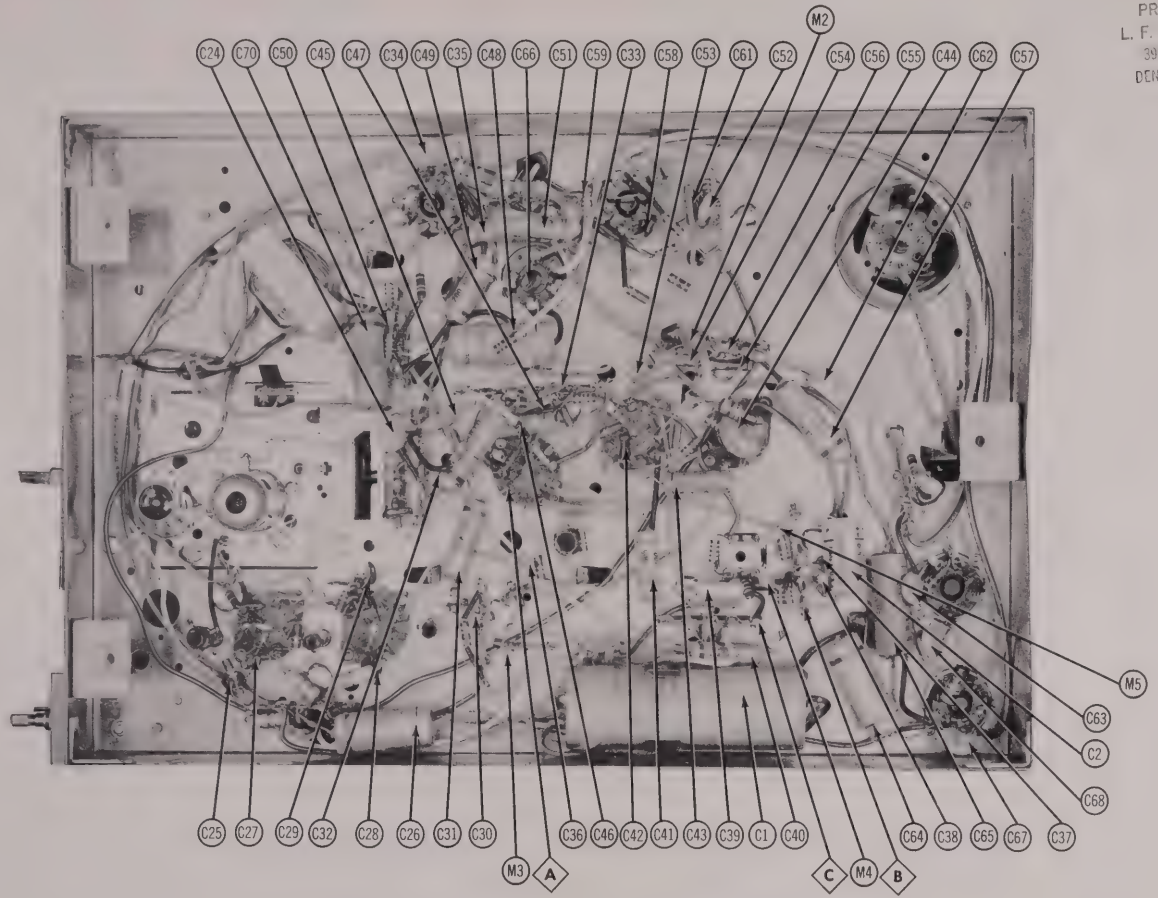

CHASSIS BOTTOM VIEW-CAPACITOR AND ALIGNMENT IDENTIFICATION

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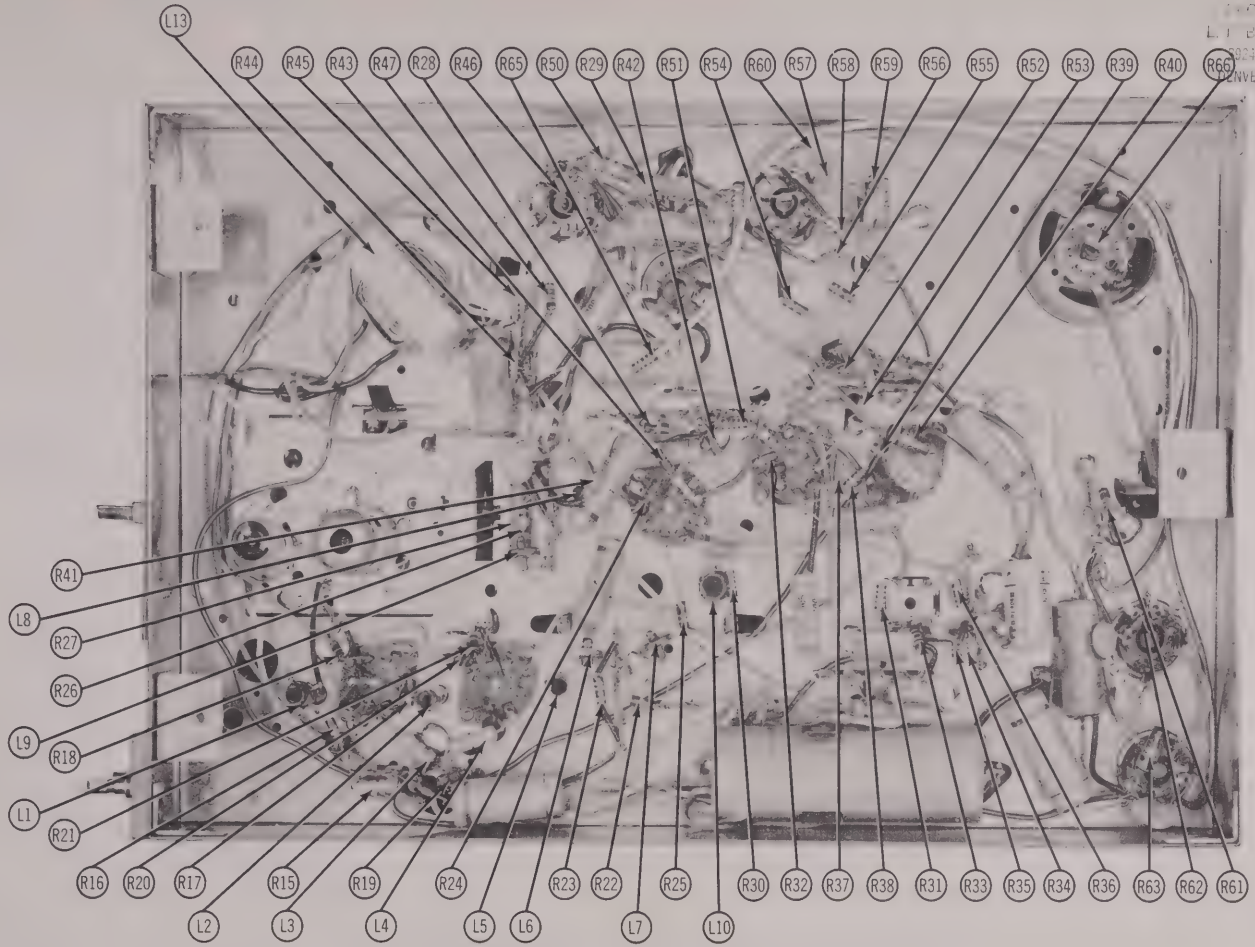

CHASSIS BOTTOM VIEW-RESISTOR AND INDUCTOR IDENTIFICATION

TUBE PLACEMENT CHART

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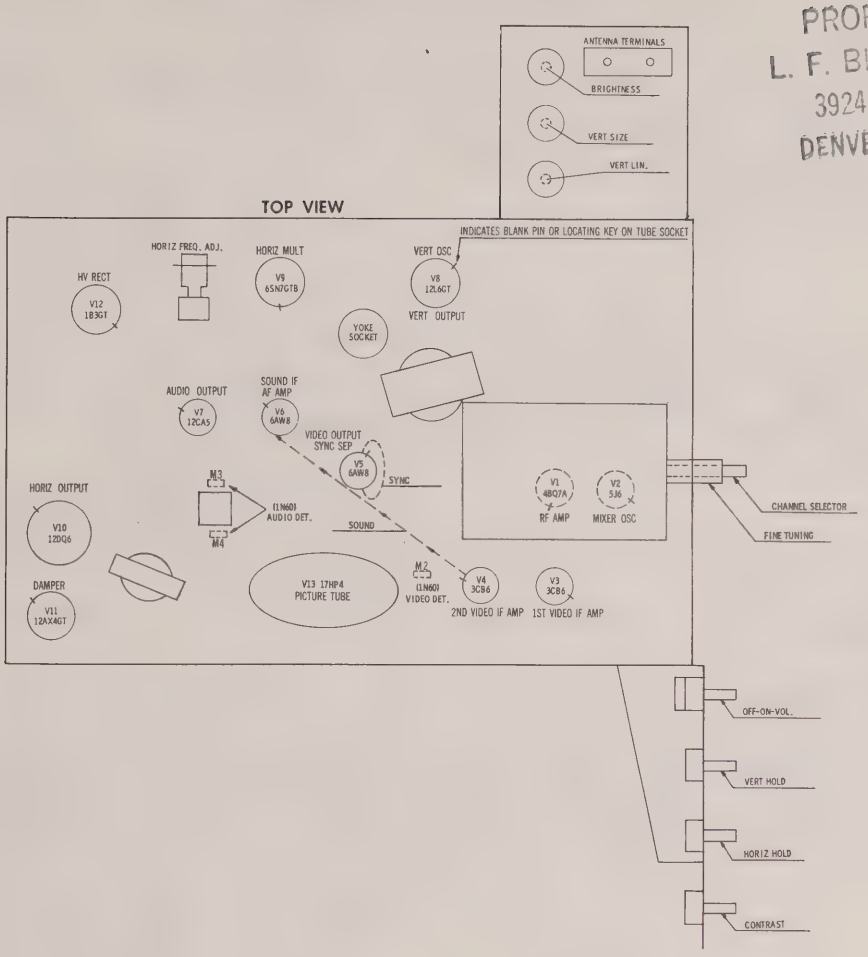


TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

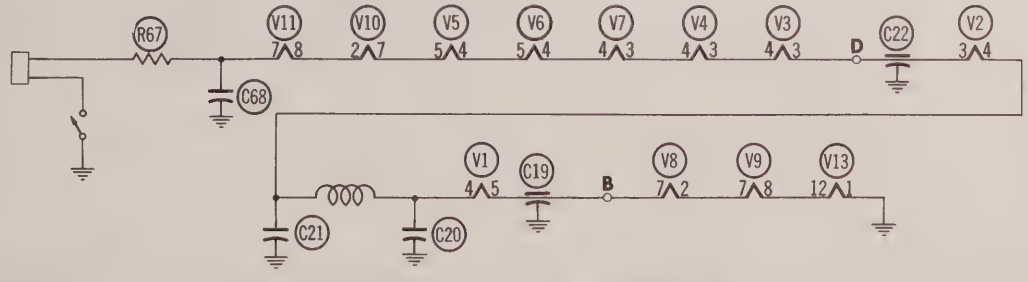
POWER SUPPLY FAILURE
No raster, no sound - Selenium Rectifier (M1)

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - V2, V3, V4
No pic, no sound, has snow - V1, V2, V3
No pic, has sound, has raster - V5, V13
Has pic, no sound - V6, V7

SYNC FAILURE
No vert. sync - V5, V8
No horiz. sync - V5, V9
No vert. or horiz. sync - V5

SWEEP FAILURE
No raster, has sound - V9, V10, V11, V12, V13
No vertical deflection - V8
Poor vert. linearity or foldover - V8
Poor horiz. linearity or foldover - V9, V10, V11
Narrow picture - V9, V10, V11, M1
Vert. off freq. - V5, V8
Horiz. off freq. - V5, V9

NOTE: Since this receiver employs tubes used in a series filament network, an open filament in any tube in series will cause the set to be inoperative.



ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Loop should be maintained in same relative position to chassis as when receiver is in cabinet.
Use isolation transformer, if available. If not, connect a .1MFD capacitor in series with low side of signal generator and B-.
To set pointer, turn tuning capacitor fully closed and set pointer to last reference mark at low frequency end of dial.

AM ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.05MFD	High side to pin 2 (grid) of 12AT7 (V2). Low side to chassis.	455KC (400∿ Mod)	BC	600KC	Across voice coil.	A1, A2, A3, A4, A5	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001MFD to reduce hum modulation.
2.		Loop	1600KC	"	1600KC	"	A6	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.		"	1400KC	"	Tune to 1400KC signal.	"	A7	"

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Use 2 Meg resistor in series with DC probe of VTVM.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
4.	.05MFD	High side to pin 1 (grid) of 12AU6 (V5). Low side to chassis.	10.7MC (unmod)	FM	Point of non-interference.	DC probe to point Ⓐ. Common to chassis.	A8	Adjust for maximum deflection.
5.	"	"	"	"	"	DC probe to point Ⓑ. Common to chassis.	A9	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.
6.	"	High side to pin 1 (grid) of 12BA6 (V4). Low side to chassis.	"	"	"	DC probe to point Ⓒ. Common to chassis.	A10, A11	Adjust for maximum deflection.
7.	"	High side to pin 1 (grid) of 12BA6 (V3). Low side to chassis.	"	"	"	"	A12	"
8.	"	High side to pin 2 (grid) of 12AT7 (V2). Low side to chassis.	"	"	"	"	A13, A14	"

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60∿ modulation and 450KC sweep. Use 120∿ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
4.	.05MFD	High side to pin 1 (grid) of 12AU6 (V5). Low side to chassis.	10.7MC (450KC Swp)	FM	Point of non-interference.	Vert. amp. to point Ⓐ. Low side to chassis.	A8	Adjust for curve of maximum amplitude and symmetry similar to Fig. 1.
5.	"	"	"	"	"	Vert. amp. to point Ⓑ. Low side to chassis.	A9	Adjust so that 10.7MC occurs at center of crossover lines similar to Fig. 2. SLIGHTLY retouch A8 for maximum amplitude and straightness of crossover lines.
6.	"	High side to pin 1 (grid) of 12BA6 (V4). Low side to chassis.	"	"	"	Vert. amp. to point Ⓒ. Low side to chassis.	A10, A11	Adjust for curve of maximum amplitude and symmetry similar to Fig. 1.
7.	"	High side to pin 1 (grid) of 12BA6 (V3). Low side to chassis.	"	"	"	"	A12	"
8.	"	High side to pin 2 (grid) of 12AT7 (V2). Low side to chassis.	"	"	"	"	A13, A14	"

FM RF ALIGNMENT

Use 2 Meg resistor in series with DC probe of VTVM.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
9.	270Ω carbon resistor	High side thru 270Ω to FM antenna terminal. Low side to chassis.	98MC (unmod)	FM	98MC	DC probe to point Ⓒ. Common to chassis.	A15, A16	Adjust in order given for maximum deflection.

FIG. 1

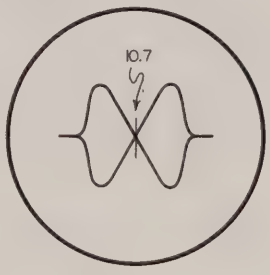


FIG. 2

ALIGNMENT INSTRUCTIONS (cont)

RF AND MIXER ALIGNMENT

Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection. The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
5.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	207MC (10MC Swp)	205.25MC 209.75MC	12	Vert. Amp. thru 10K to point (D). Low side to chassis.	A22,A23, A24	Adjust for response curve similar to Fig. 5 with markers above 90%.
6.	"	"	213MC (10MC Swp)	211.25MC 215.75MC	13	"	"	Check for response similar to Fig. 5. If markers fall below 70% on any channel, make compromise adjustments of A22, A23 and A24 with channel switch set to that channel. Check all other channels to see that they have not been seriously affected.
			201MC (10MC Swp)	199.25MC 203.75MC	11			
			195MC (10MC Swp)	193.25MC 197.75MC	10			
			189MC (10MC Swp)	187.25MC 191.75MC	9			
			183MC (10MC Swp)	181.25MC 185.75MC	8			
			177MC (10MC Swp)	175.25MC 179.75MC	7			
			85MC (10MC Swp)	83.25MC 87.75MC	6			
			79MC (10MC Swp)	77.25MC 81.75MC	5			
			69MC (10MC Swp)	67.25MC 71.75MC	4			
			63MC (10MC Swp)	61.25MC 65.75MC	3			
			57MC (10MC Swp)	55.25MC 59.75MC	2			

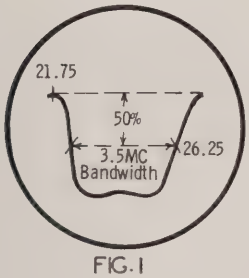


FIG. 1

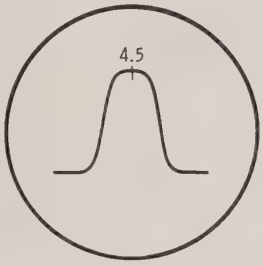


FIG. 2

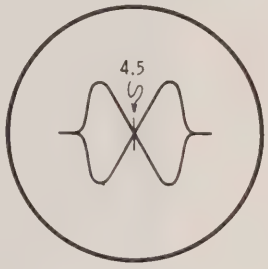


FIG. 3

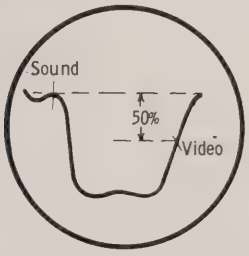


FIG. 4

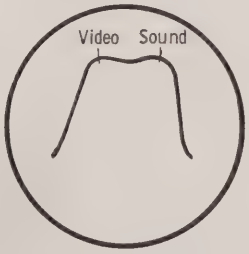
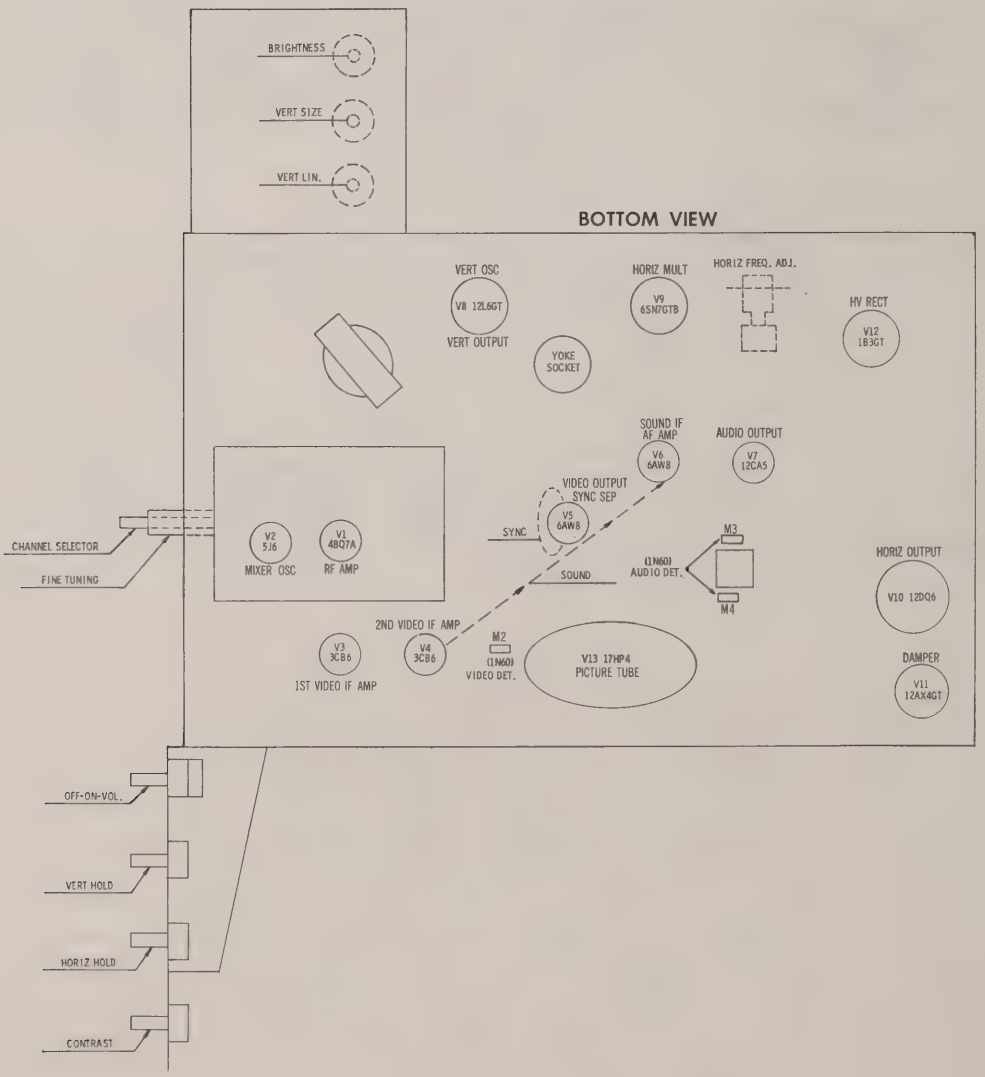


FIG. 5

RESISTANCE MEASUREMENTS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	4BQ7A	† 23Ω	830K	0Ω	8Ω	6Ω	† 23Ω	830K	0Ω	0Ω
V2	5J6	† 10K	† 8200Ω	9Ω	8Ω	220K	10K	0Ω		
V3	3CB6	830K	56Ω	9Ω	10Ω	† 70Ω	† 70Ω	0Ω		
V4	3CB6	.5Ω	82Ω	10Ω	11Ω	† 70Ω	† 70Ω	0Ω		
V5	6AW8	0Ω	2.2Meg	▲ 75K	14Ω	15Ω	● 100Ω	2.2Meg	† 23Ω	† 5600Ω
V6	6AW8	0Ω	2.2Meg	† 220K	12Ω	14Ω	220Ω	1.1Ω	† 23Ω	† 23Ω
V7	12CA5	100Ω	470K	11Ω	12Ω	470K	† 23Ω	† 380Ω		
V8	12L6GT	TP	3Ω	† 470Ω	● † 30K	800K	TP	6Ω	0Ω	
V9	6SN7GTB	1.5Meg	† 4700Ω	1500Ω	● 130K	† 20K	1500Ω	3Ω	2Ω	
V10	12DQ6	NC	17Ω	NC	† 125Ω	1Meg	NC	15Ω	0Ω	TOP CAP ▲ 10Ω
V11	12AX4GT	NC	NC	INF	NC	† 23Ω	NC	20Ω	17Ω	
V12	1B3GT		PINS	1 - 8	HAVE	INF	RESISTANCE			TOP CAP ▲ 405Ω
V13	21AUP4A	0Ω	47K	PIN 6 ▲ 20Ω	PIN 10 ▲ 20Ω	PIN 11 ● † 270K	PIN 12 2Ω			

† MEASURED FROM OUTPUT OF M2.
▲ MEASURED FROM PIN 3 OF V11.
● THIS READING WILL VARY. CONTROL SET FOR NORMAL OPERATION.
TP TIE POINT
NC NO CONNECTION.



TUBE PLACEMENT CHART

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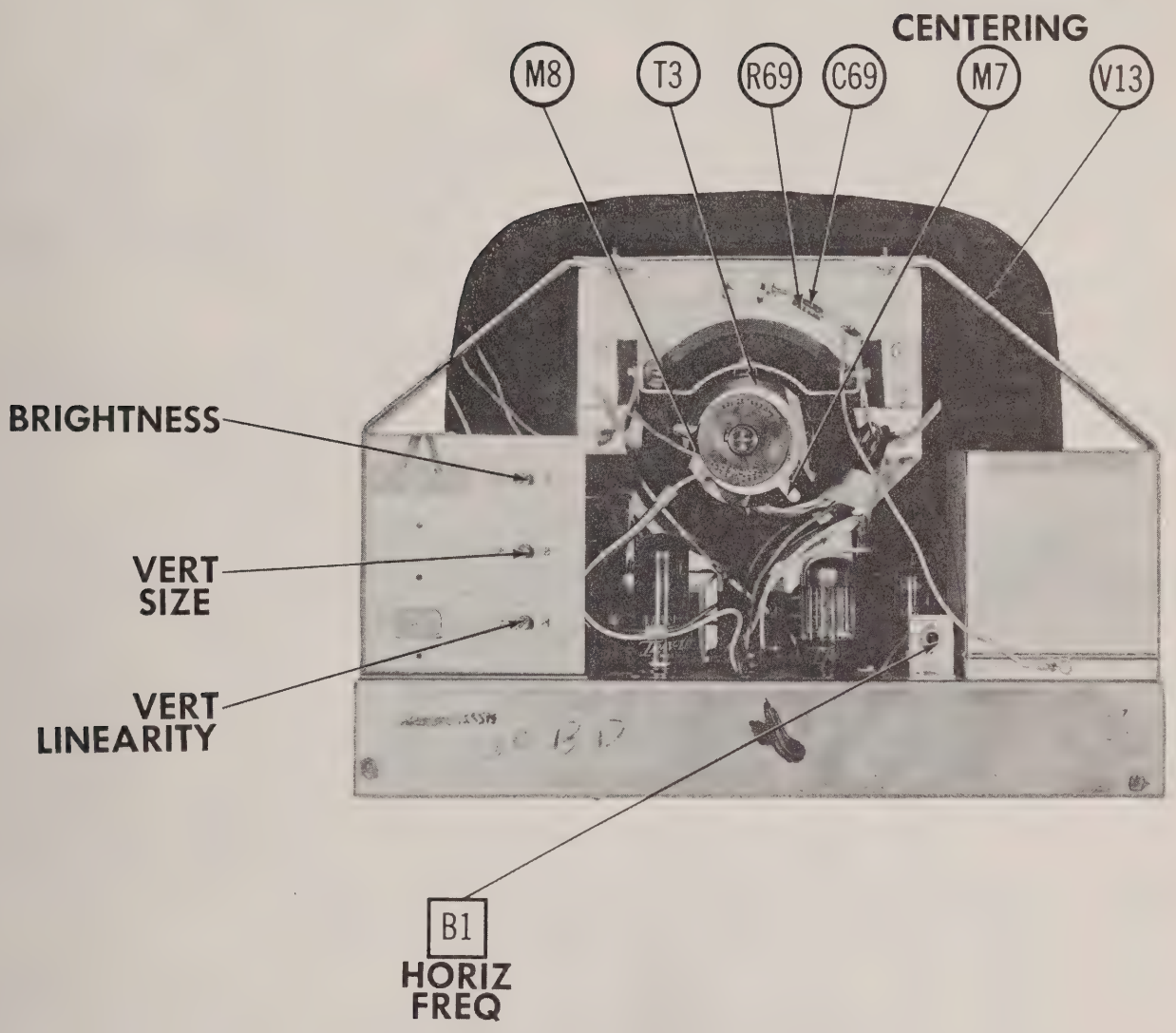


CHASSIS—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably with a test pattern.

Set the horizontal hold control at the center of its range. Adjust the horizontal frequency slug (B1) until the picture synchronizes horizontally.

Check the lock-in action by switching off station and back again. If the picture does not pull into sync, slightly retouch B1 until proper sync action is obtained.

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	RF Amplifier	6BQ7A	
V2	Mixer-Oscillator	5J6	
V3	1st Video IF Amplifier	3CB6	
V4	2nd Video IF Amplifier	3CB6	
V5	Video Output, Sync Separator	6AW8	
V6	Sound IF Amplifier-AF Amplifier	6AW8	
V7	Audio Output	12CA5	
V8	Vert Oscillator-Vert. Output	12L8GT	
V9	Horiz. Mult	6S3GTB	
V10	Horiz. Output	12DQ6	
V11	Damper	12AX4GT	
V12	HV Rectifier	1B3GT	

PICTURE TUBE

ITEM No.	REPLACEMENT DATA				NOTES
	Trav-Ler PART No.	CBS PART No.	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	
V13	21AUP4A ①	21AUP4A ①	21AUP4A ①	21AUP4A/B ① ②	① Aluminized ② Silver screen "85"
	17HP4	21AUP4 17HP4	21AUP4 17HP4	21AUP4 17HP4	
		17HP4	17HP4	17HP4	
		17HP4B ①	17HP4B ①	17HP4B ①	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	MFD	VOLT	Trav-Ler PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
A	250	50	TV EL 39	PR30102		WT320	CDB-1015	D-095	R2294 *
B	150	150						MT-1508	
C	50	50	TV EL-20	PN550V.0	BR105	TC32	TD-10-50	FM-0850	TVA-1304

* Non-catalog item

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP	VOLT	Trav-Ler PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.
C1	.1	600		NPO-S11	TCZ-1	TZ03	MPGA-S11		5TCCB-V1
C2	6.8	600		NPO-D15.8	TCZ-6R8	Z013	MPGA-6R8	Z7-5568	5TCCB-V68
C3	6.8	500		NPO-D15.8	TCZ-6R8	Z013	MPGA-6R8	Z7-5568	5TCCB-V68
C4	33	500		NPO-D33	TCZ-33R3	Z007	MPGA-G30	Z7-553	5TCCB-V33
C5	2.2	500		NPO-S22.2	TCZ-2R2	Z006	MPGA-2R2		5TCCB-V22
C6	3.3	500			S29-3		311S-01-2R5	CT565A	
C7	1000	500		BPD-001	DD-102	K069	801-001	DC-531	5HK-D1
C8	100	500							
C9	3.3	500			S29-3		311S-01-2R5	CT565A	
C10	10	500							
C11	6.8	500		NPO-D6.8		Z018	MPGA-5R3		
C12	1000	500		BPD-001	DD-102	K069	801-001	DC-531	5HK-D1
C13	100	500							
C14	1000	500		BPD-001	DD-102	K069	801-001	DC-531	5HK-D1
C15	1000	500		BPD-001	DD-102	K069	801-001	DC-531	5HK-D1
C16	100	500							
C17	1000	500		BPD-001	DD-102	K069	801-001	DC-531	5HK-D1
C18	5000	500	TV-CC-3	BPD-005	DD-502	K080	811-006	DC-525	5HK-D5
C19	1000	500	TV-CC-3	BPD-001	DD-103	K069	801-001	DC-531	5HK-D1
C20	25	200	TV-CC-4	P288N-25		CUB3P25		P7P025	5TM-P25
C21	330	500	TV-CC-3	S2330	D6-321	TP43	GPBK-331	UC-5333	5GA-T33
C22	1000	500	TV-CC-3	BPD-001	DD-103	K069	801-001	DC-531	5HK-D1
C23	1000	500		BPD-001	DD-102	K069	801-001	DC-531	5HK-D1
C24	4	500	TV-CC-5	NPO-H4.7	TCZ-4R7	T207	MPGA-4R7	Z7-5547	5TCCB-V47
C25	82	500	TV-PC-2	BPD-02	DF-303	CUB3E2	817-02	P7E13	5TM-S2
C26	220	200	TV-PC-3	P288N-1		DF-104	CUB3P1	P7P101	5TM-P1
C27	1000	500	TV-PC-4	BPD-001	DD-102	K069	811-005	DC-525	5HK-D5
C28	22	200	TV-PC-2	BPD-02	DF-303	CUB3E2	817-02	P7E13	5TM-S2
C29	82	500	TV-PC-15	BPD-01	DF-103	CUB3E1	GPB-333-103	P7E11	5TM-S1
C30	4.7		TV-PC-16	NPO-S4.7	TCZ-4R7	T207	MPGA-4R7	Z7-5547	5TCCB-V47
C31	1000		TV-CC-13	S247	D6-470	TP29	GPBK-470	UC-5447	5GA-Q47
C32	1000		TV-CC-7	1464-001		1R5D1	811-108	MCB255	MB-31
C33	3300	500	TV-MC-12	1464-00032		1R5D23			MB-322
C34	.01	600	TV-PC-10	BPD-01	D6-103	CUB4E1	GP3-333-103	P7411	47M-E1
C35	.005	600	TV-PC-10	BPD-005	D6-502	CUB4D5	GP2-333-502	P7E25	47M-D5
C36	100		TV-CC-1	S100	D6-101	TP34	GPBK-101	UC-531	5GA-T1
C37	.01	600	TV-PC-10	BPD-01	D6-103	CUB4E1	GP3-333-103	P7411	47M-E1
C38	4700		TV-CC-35	BPD-0047	DD-472	K079	811-0047	DC-525	5HK-D47
C39	330	500	TV-MC-3	S330	D6-331	TP39	GPBK-331	UC-5333	5GA-T33
C40	.005	600	TV-PC-10	BPD-005	D6-502	CUB4D5	GP3-333-502		
C41	1000		TV-CC-1	BPD-001	DD-102	K069	801-001	DC-531	5HK-D1
C42	.22	200	TV-PC-15	P288N-23		CUB3P23		P7P023	5TM-P22
C43	.022	200	TV-PC-23	BPD-03	DF-203	CUB4E23	817-03	P7E123	5TM-S22
C44	.0022	200	TV-PC-24	BPD-0022	DF-223	CUB3S53	GP3-333-223	P7P23	5TM-D22
C45	.02	600	TV-PC-14	BPD-03	DF-203	CUB4E3	817-03	P7E13	5TM-S2
C46	5000		TV-CC-3	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5
C47	68	500	TV-MC-21	NPO-S68	D6-680	22R5Q68	831-680		MB-468
C48	330	500	TV-MC-12	1464-00033	D6-331	5R5T33	811-331		MB-333
C49	1000		TV-CC-1	1464-001		1R5D1	811-108	MCB255	MB-31
C50	1000		TV-CC-7	1464-001		1R5D1	811-108	MCB255	MB-31
C51	.1	200	TV-PC-25	P288N-1	DF-104	CUB3P1		P7P101	5TM-P1
C52	1000		TV-CC-3	BPD-001	DD-102	K069	801-001	DC-531	5HK-D1
C53	330		TV-MC-12	1464-00033	D6-331	5R5T33	811-331		MB-333
C54	3300	500	TV-MC-12	1464-0039		1R5D39		MCB468	MB-339
C55	330	500	TV-MC-15	1468-00033	D6-331	5R5T33	811-331		MB-333
C56	330	500	TV-MC-12	1464-00065	D6-681	1R5T68	811-681		MB-368
C57	5000		TV-CC-3	BPD-005	DD-502	K080	811-006	DC-525	5HK-D5
C58	.22	200	TV-PC-25	P288N-23		CUB3P23		P7P023	5TM-P22
C59	.1	400	TV-PC-26	P688N-1	DF-104	CUB6P1		P7P101	6TM-P1
C60	68	3000	TV-CC-41	BVD-30-68	DD30-683	VDQ68	2KV-680	DC30468	30GA-Q68
C61	47	1000		BVD-10-47		V5Q47			10GA-Q47
C62	5000		TV-CC-3	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5
C63	5000	3500	TV-CC-40	BVD-15-470K	DD15-503	VDS5	15KV-470	20DK-D5	20DK-D5
C64	.1	600	TV-PC-16	P688N-1	DF-104	CUB6P1		P7P101	6TM-P1

Note 1. Some versions may use 1M4F unit in this application.
Note 2 Used on 21" models only.
Note 3. Not used in some versions.

PARTS LIST AND DESCRIPTIONS

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	Trav-Ler PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	1Meg	1	TV-VC-51	AB-70	A47-1Meg-2	Q13-157	U53	Volume
B	Shaft		Not Req.	AK-4	KSB-3	Not Req.	Not Req.	Attach to R1A
C	Switch		Not Req.	EB-1	SWS-13	T6-1	U5-30	Attach to R1A
R2A	50K	1	VC-73	AB-31	A47-50K-S	Q11-133	TA54L	Vert. Hold - Note 1
B	Shaft		Not Req.	AK-4	KSB-3	Not Req.	Not Req.	Attach to R2A
R3A	50K	1	VC-73	AB-31	A47-50K-S	Q11-133	TA54L	Horiz. Hold
B	Shaft		Not Req.	AK-4	KSB-3	Not Req.	Not Req.	Attach to R3A
R4A	1Meg	1	VC-81	AB-65	A47-1000-S	Q11-198	TA31L	Contrast
B	Shaft		Not Req.	AK-4	KSB-3	Not Req.	Not Req.	Attach to R4A
R5A	250K	1	VC-74	AB-59	A47-250K-S	Q11-135	TA55L	Brightness - Note 2
B	Shaft		Not Req.	AK-1	RN-3	Not Req.	Not Req.	Attach to R5A
R6A	50K	1	VC-73	AB-31	A47-50K-S	Q11-133	PTA54L	Vert. Size
B	Shaft		Not Req.	AK-1	RN-3	Not Req.	Not Req.	Attach to R6A
R7A	250K	1	VC-74	AB-59	A47-250K-S	Q11-135	TA55L	Vert. Linearity-Note 3
B	Shaft		Not Req.	AK-1	RN-3	Not Req.	Not Req.	Attach to R7A

Note 1. Some versions may use an alternate control part #VC-72A in this application.
Note 2. Some versions may use an alternate control part #VC-74A in this application.
Note 3. Some versions may use an alternate control part #VC-76A in this application.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		REPLACEMENT DATA			NOTES
	OHMS	WATT	Trav-Ler PART No.		IRC PART No.	
R8	680K				BTS-680K	
R9	4700Ω				BTS-4700	
R10	10K				BTS-10K	
R11	330K				BTS-330K	
R12	10K				BTS-10K	
R13	10K				BTS-10K	
R14	4300Ω				BTS-4300	
R15	4700Ω	1	TV-IR-68		BTA-4700	
R16	22K		TV-IR-45			
R17	22K		TV-IR-45		BTS-22K	
R18	68Ω		TV-IR-13		BTS-68	
R19	470		TV-IR-97		BTS-47	
R20	22K		TV-IR-45			Note 1
R21	82Ω		TV-IR-73		BTS-82	
R22	5800Ω		TV-IR-53		BTS-5800	
R23	330K		TV-IR-116		BTS-330K	
R24	2.2Meg		TV-IR-13		BTS-2.2Meg	
R25	100Ω		TV-IR-104		BTS-100	
R26	10K		TV-IR-64		BTS-10K	
R27	5600Ω	2	TV-IR-123		BTB-5600	
R28	150K		TV-IR-95		BTS-150K	
R29	47K		TV-IR-66		BTS-4700	
R30	33K		TV-IR-65		BTS-33K	
R31	33K		TV-IR-65		BTS-33K	Note 2
R32	220Ω		TV-IR-5		BTS-220	
R33	33K		TV-IR-58		BTS-33K	
R34	470Ω		TV-IR-6		BTS-470	
R35	6800Ω		TV-IR-76		BTS-6800	
R36	6800Ω		TV-IR-76		BTS-6800	
R37	2.2Meg		TV-IR-13		BTS-2.2Meg	
R38	330K		TV-IR-81		BTS-330K	
R39	470K		TV-IR-11		BTS-470K	

ITEM No.	RATING		REPLACEMENT DATA			NOTES
	OHMS	WATT	Trav-Ler PART No.		IRC PART No.	
R40	100Ω		TV-IR-104		BTS-100	
R41	330K 5%		TV-IR-61		BTS-330K 5%	
R42	2.2Meg		TV-IR-13		BTS-2.2Meg	
R43	620Ω		TV-IR-60		BTS-620Ω	
R44	1.5Meg		TV-IR-118		BTS-1.5Meg	
R45	180K		TV-IR-115		BTS-180K	
R46	330K		TV-IR-116		BTS-330K	
R47	1800Ω		TV-IR-123		BTS-1800	
R48	270K		TV-IR-82		BTS-270K	
R49	150K		TV IR-95		BTS-150K	
R50	47K	1	TV-IR-120		BTA-47K	
R51	470Ω		TV-IR-6		BTS-470	
R52	1Meg 5%		TV-IR-105		BTS-1Meg 5%	
R53	1Meg 5%		TV-IR-105		BTS-1Meg 5%	
R54	1Meg		TV-IR-12			
R55	100K		TV-IR-63			
R56	4700Ω		TV-IR-68			
R57	1800Ω		TV-IR-39			
R58	100K		TV-IR-63			
R59	15K		TV-IR-83			
R60	4700Ω	1	TV-IR-68			
R61	10K		TV-IR-64			
R62	1Meg		TV-IR-12			
R63	100Ω		TV-IR-104			
R64	4700Ω	1	TV-IR-68			
R65	68Ω		TV-IR-51		BTS-68K	Note 1
R66	2.2Ω		TV-WR-21		BW}-2.2	
R67	44Ω	25	TV-WR-30			
R68	5Ω	5	TV-F-6			
R69	330K	1	TV-IR-124		BTA-330K	

Note 1. Not used in some versions.
Note 2: Some versions use a 22K resistor in this application. (Part #TV-IR-45)

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA							NOTES
		Trav-Ler PART No.	Halldorson PART No.	Merit PART No.	RCA PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	Vert. Osc. & Vert. Output Trans.	TV-TR-18							
T2	Horiz. Output Trans.	TV-TR-19	FB418 * ①	HVO-36 * ①	25571 * ①	X094 * ①	A-8280 * ①	FLY-16 * ①	D-50 * ①
T3A	Yoke-Horiz.(25MH)	TV-L-60	DF803 ②	MDF-74 ②	21HD ②	Y70F28/3 ②	DY-10A ②	Y-11 ②	Y-20 ②
B	Vert. (D-7M9)								

① Drill new mounting hole(s).
② Requires new centering device.
* This part may be superseded by Parts Manufacturer's introduction of special unit for this application.

*HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA

Use Original Width Coil Unless Replacement Type Is Listed

ORIGINAL TERMINAL CONNECTIONS	Halldorson Replacement Connections	Merit Replacement Connections	RCA Replacement Connections	Ram Replacement Connections	Stancor Replacement Connections	Thordarson Replacement Connections	Triad Replacement Connections
7	9	9	9	9	3	9	9
4	7	7	7	7	2	7	7
T	NC See Note ③	NC See Note ③	NC See Note ③	NC See Note ③	NC See Note ③	NC See Note ③	NC See Note ③
1	1	1	1	1	1	1	1
Special Notes:	③	③	③	③	③	③	③

③ Install damping network consisting of approximately 50-100MMF ⑤ 2KV, and 10000Ω ¼W connected in series across terminals #3 and #7 of horizontal yoke.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA					NOTES
	PRI	SEC	Trav-Ler PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T4	4.5K	3-4Ω	AT-16		Z1107	A-3280	24S60	S-51X

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP	Trav-Ler PART No.	QUAM PART No.	RCA TYPE No.	
SP1	5"	PM	3-4Ω	SPK-36	5A07	20582	

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA			NOTES
		PRI.	SEC.	Trav-Ler PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	1st. Video IF	.1Ω	.6Ω	TV-L-63				
L2	2nd. Video IF	.6Ω	.5Ω	TV-L-61				
L3	RF Choke	1.8Ω		TV-L-58	19-1062		4606	2.2 Microhenries, IRC part #CLA
L4	RF Choke	8Ω		TV-L-59				7.5 Microhenries IRC part #CLA
L5	3rd. Video IF	.8Ω	.8Ω	TV-L-62				
L6	Series Peaking Coil	17Ω		TV-L-66	19-3300 *	TV-190 *	6133 *	330 Microhenries, wound on 37K resistor
L7	Shunt Peaking Coil	30Ω		TV-L-65	19-3660		6148	680 Microhenries
L8	Series Peaking Coil	17Ω		TV-L-66	19-3300 *	TV-190 *	6133 *	330 Microhenries wound on 37K resistor
L9	Shunt Peaking Coil	30Ω		TV-L-65	19-3660		6148	680 Microhenries
L10	Sound IF	1.1Ω		TV-L-64C				
L11	Ratio Detector	4.3Ω	1.6DCT	TV-L-17	19-3497	TV-115	6806	Tertiary winding - 7Ω

TRANSFORMER (HORIZ. OSC.)

ITEM No.	DC RES.		REPLACEMENT DATA						NOTES
	PRI.	SEC.	Trav-Ler PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	RCA TYPE No.	Ram PART No.	Thordarson PART No.
L12	180Ω		TV-L-64	19-1276	TV-163	6310			28I-5

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA					NOTES
	TOTAL DIRECT CURRENT	D. C. RESISTANCE	INDUCTANCE @ CURRENT (1000 ~)	Trav-Ler PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
L13	.270A	23Ω	.6 Hy	FC-3				28C44 ①	C-23X ①

① Drill one new mounting hole.

SELENIUM RECTIFIER

ITEM No.	RATING	REPLACEMENT DATA					NOTES
	CURRENT	Trav-Ler PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	MALLORY PART No.	RADIO RECEPTOR PART No.	SARKES TARZIAN PART No.	
M1	.270A	SR-5	1090A	MR300	SS300	S24	300	

SELENIUM DIODE

ITEM No.	RATING	REPLACEMENT DATA						NOTES
	CURRENT	Trav-Ler PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	MALLORY PART No.	RADIO RECEPTOR PART No.	SARKES TARZIAN PART No.	
M2		SR-6	1215 ①	171 ①				① Two required

CRYSTAL DIODES

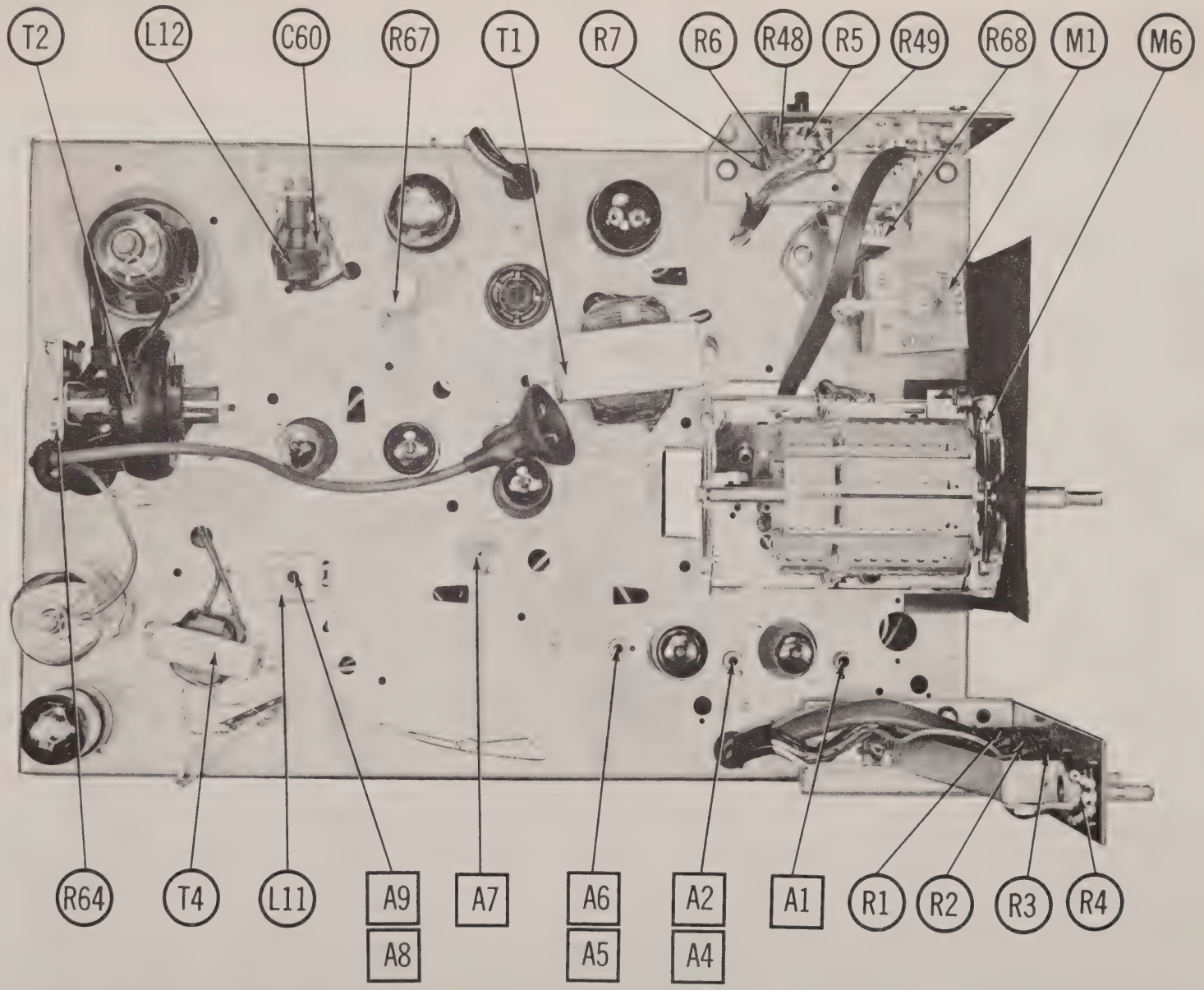
ITEM No.	ORIG TYPE	REPLACEMENT DATA		NOTES
		Trav-Ler PART No.	SYLVANIA PART No.	
M3	1N295 *	TV-SC-1	1N60	Video Detector (Pigtail)
M4	1N60	TV-SC-1	1N60	Radio Detector (Pigtail)
M5	1N60	TV-SC-1	1N60	Radio Detector (Pigtail)

* Some versions may use crystal diode type 1N60 in this application.

MISCELLANEOUS

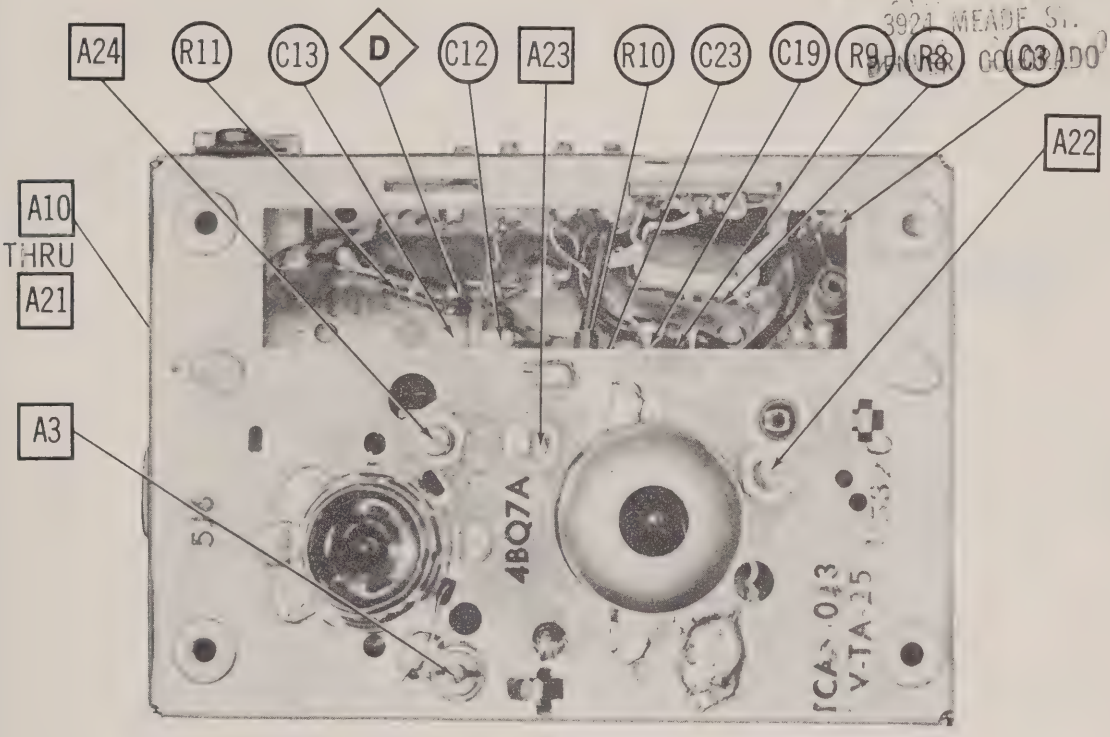
ITEM No.	PART NAME	Trav-Ler PART No.	NOTES
M6	Tuner	TA-25	VHF
M7	Centering Device		Part of deflection yoke (T3) rear cover
M8	Ion Trap	TV-MA-7	
	Knob	TV-K-150	Fine tuning
	Knob	TV-K-151	Channel selector
	Knob	TV-K-152	On-off-volume, vertical hold, horiz. hold, contrast
	Safety Glass	TV-DW-53	Models 517-106, 517-107
	Safety Glass	TV-DW-56	Models 521-111, 521-112
	Mask	TV-MP-46	Models 517-106, 517-107
	Mask	TV-MP-56	Models 521-111, 521-112

TRAV-LER MODELS 517-106, -107, 521-111, -112 (Ch. 520A5)

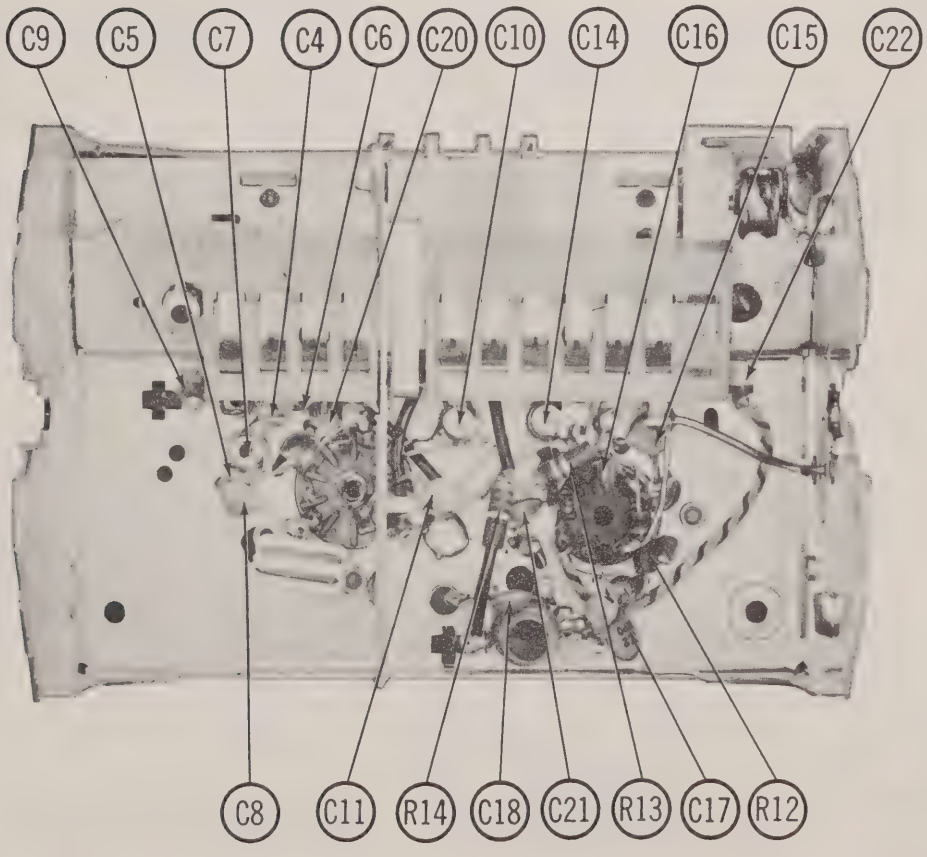


CHASSIS TOP VIEW

PROPERTY OF
C. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO



RF TUNER-TOP VIEW



RF TUNER-BOTTOM VIEW

ZENITH MODELS Y723G, R, W (Ch. 7Y04), Y724G, R, W (Ch. 7Y02)

PROPERTY OF
L. F. BLANKI
3924 MEADE S...
DENVER, COLO...

ZENITH MODELS Y723G, R, W
(Ch. 7Y04), Y724G, R, W (Ch. 7Y02)

ZENITH MODELS Y723G, R, W
(Ch. 7Y04), Y724G, R, W (Ch. 7Y02)

TRADE NAME	Zenith Models Y723G, Y723R, Y723W (Ch. 7Y04), Y724G, Y724R, Y724W (Ch. 7Y02)
MANUFACTURER	Zenith Radio Corp., 6001 Dickens Ave., Chicago 39, Ill.
TYPE SET	AC-DC Operated FM-AM Superheterodyne Receiver
TUBES (Seven)	Types 12BA6 FM RF Amplifier, 12AT7 Mixer-Osc., 12BA6 1st IF Amplifier, 12BA6 2nd IF Amplifier, 12AU6 Limiter, 19T8 Disc. -AM Det. -AF Amp., 35C5 Output.
POWER SUPPLY	110-120 Volts AC-DC RATING .31 Amp. @ 117 Volts AC
TUNING RANGE - BROADCAST	540KC - 1620KC FM 88MC - 108MC

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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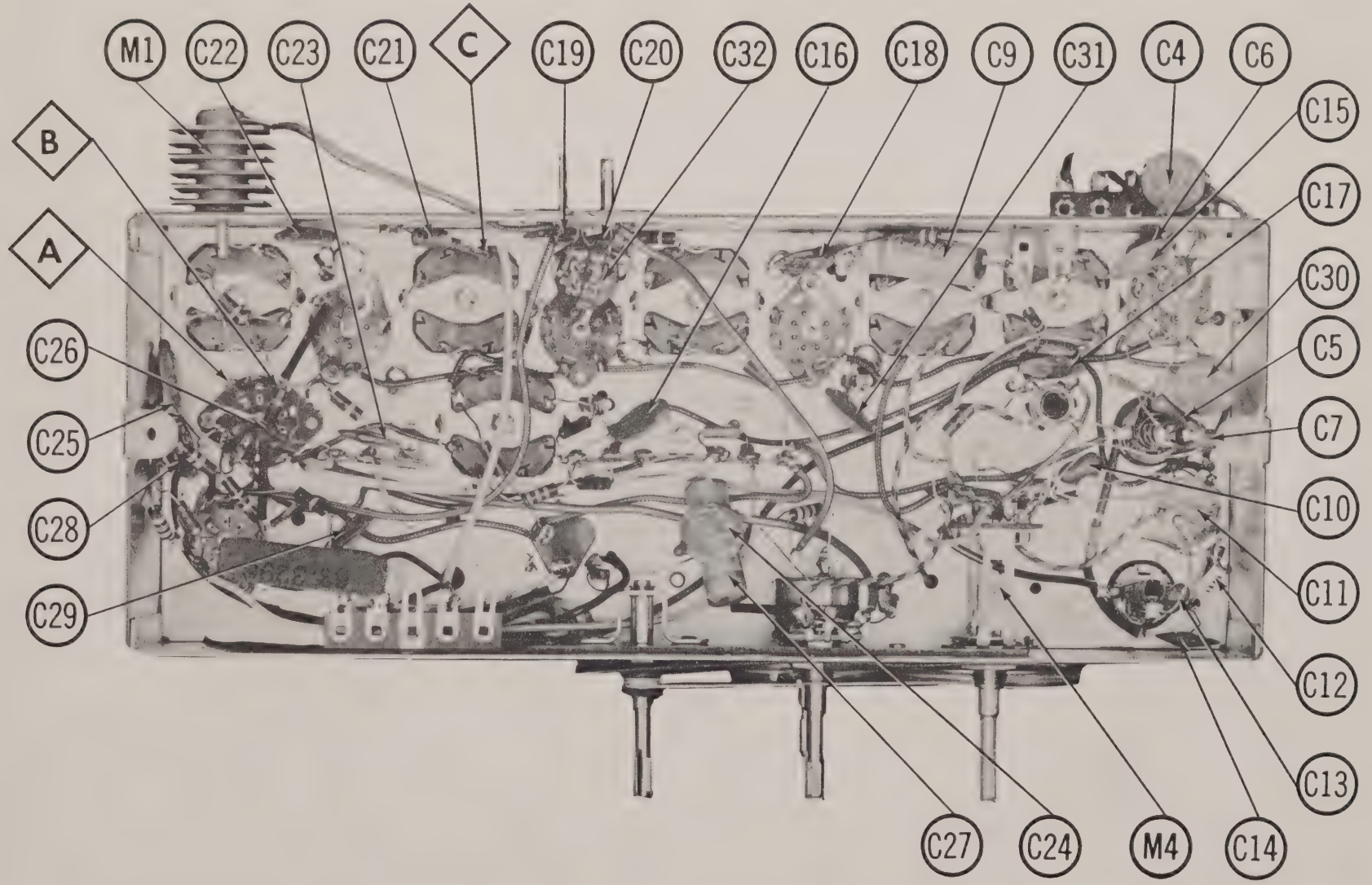
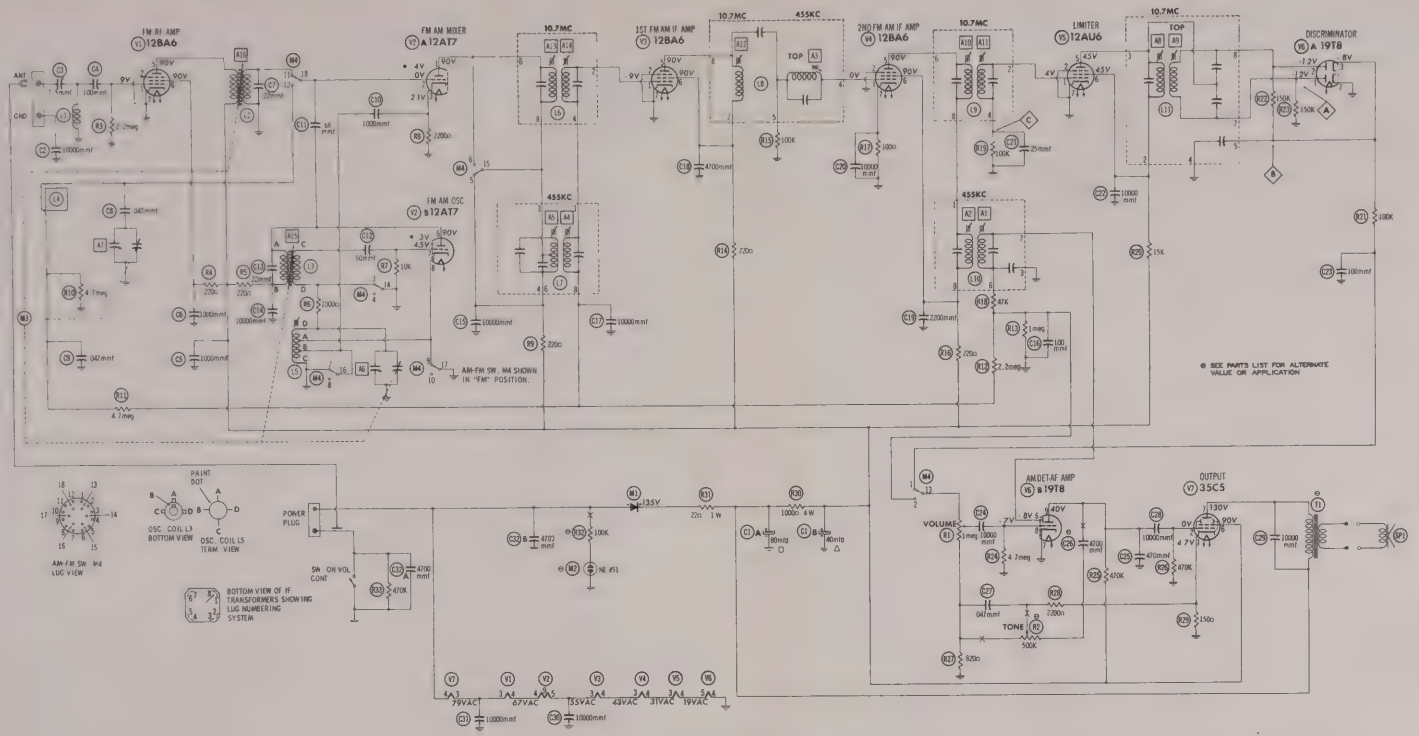


CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	12BA6	2.2Meg	0Ω	75Ω	85Ω	↑1000Ω	↑1200Ω	0Ω		
V2	12AT7	↑1200Ω	0Ω • 2.2Meg	2200Ω	85Ω	55Ω	↑1200Ω	10K	0Ω • 2Ω	60Ω
V3	12BA6	2Meg	0Ω	55Ω	40Ω	↑1200Ω	↑1200Ω	0Ω		
V4	12BA6	100K	0Ω	40Ω	30Ω	↑1200Ω	↑1200Ω	100Ω		
V5	12AU6	100K	0Ω	30Ω	18Ω	↑15K	↑15K	0Ω		
V6	19T8	150K	150K	220K	0Ω	18Ω	• 500K	0Ω	4.7Meg	↑470K
V7	35C5	150Ω	470K	75Ω	110Ω	470K	↑1000Ω	↑280Ω		

ALL MEASUREMENTS TAKEN IN "FM" POSITION UNLESS OTHERWISE DESIGNATED
↑ MEASURED FROM OUTPUT OF M1
• MEASURED IN "AM" POSITION.

1. DC voltage measurements taken with vacuum tube voltmeter.
2. AC voltages measured at 1000 ohms per volt.
3. Socket connections are shown as bottom views.
4. Measured values are from socket pin to common negative.
5. Line voltage maintained at 117 volts for voltage readings.
6. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
7. Volume control at maximum, no signal applied for voltage measurements.

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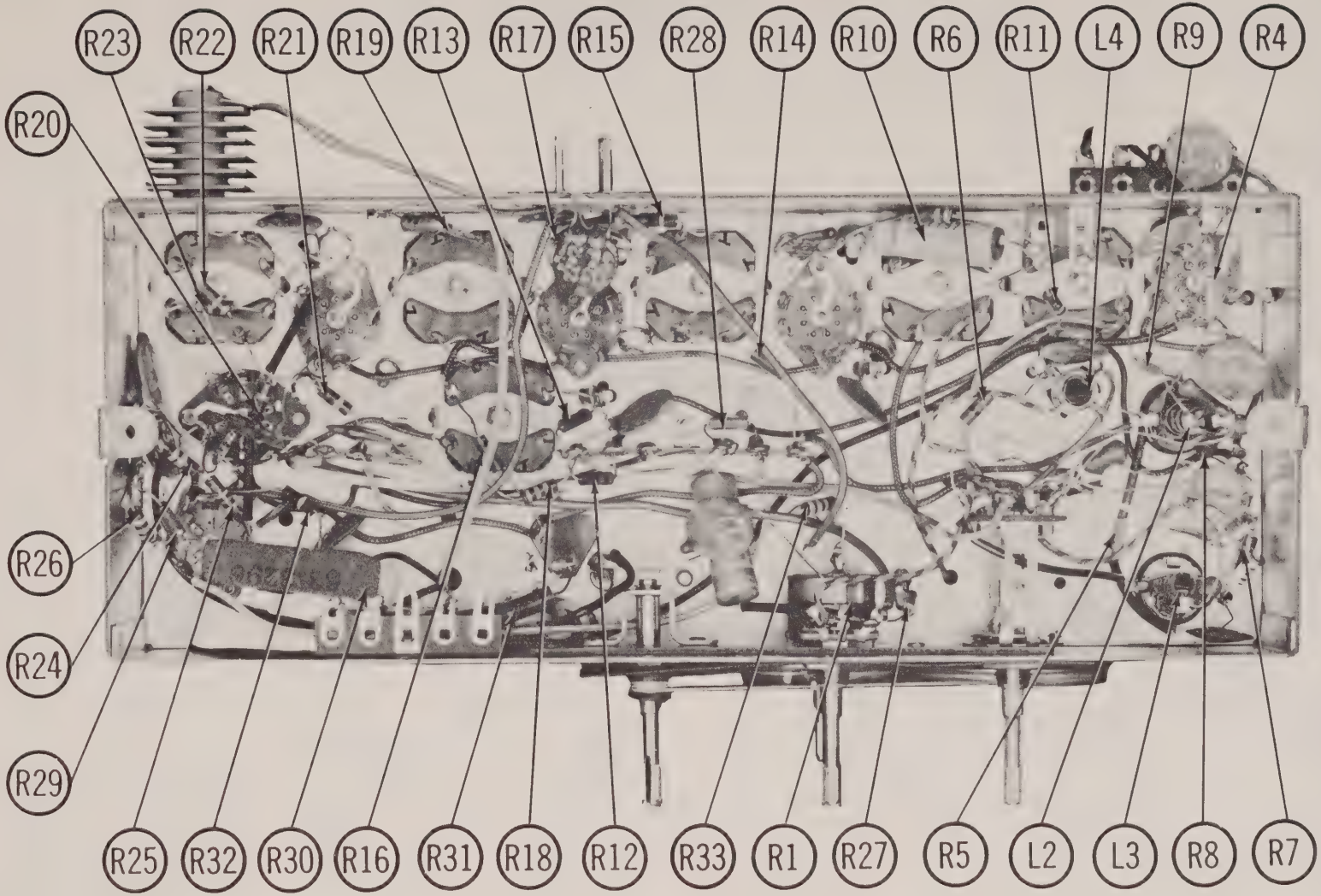


CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

L. F. SLARK
3924 MEAD
DENVER, COLO.

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Loop should be maintained in same relative position to chassis as when receiver is in cabinet.
Use isolation transformer, if available. If not, connect a .1MFD capacitor in series with low side of signal generator and B-.
To set pointer, turn tuning capacitor fully closed and set pointer to last reference mark at low frequency end of dial.

AM ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.05MFD	High side to pin 2 (grid) of 12AT7 (V2). Low side to chassis.	455KC (400∿ Mod)	BC	600KC	Across voice coil.	A1, A2, A3, A4, A5	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001MFD to reduce hum modulation.
2.		Loop	1600KC	"	1600KC	"	A6	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.		"	1400KC	"	Tune to 1400KC signal.	"	A7	"

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Use 2 Meg resistor in series with DC probe of VTVM.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
4.	.05MFD	High side to pin 1 (grid) of 12AU6 (V5). Low side to chassis.	10.7MC (unmod)	FM	Point of non-interference.	DC probe to point (A). Common to chassis.	A8	Adjust for maximum deflection.
5.	"	"	"	"	"	DC probe to point (B). Common to chassis.	A9	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.
6.	"	High side to pin 1 (grid) of 12BA6 (V4). Low side to chassis.	"	"	"	DC probe to point (C). Common to chassis.	A10, A11	Adjust for maximum deflection.
7.	"	High side to pin 1 (grid) of 12BA6 (V3). Low side to chassis.	"	"	"	"	A12	"
8.	"	High side to pin 2 (grid) of 12AT7 (V2). Low side to chassis.	"	"	"	"	A13, A14	"

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60∿ modulation and 450KC sweep. Use 120∿ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
4.	.05MFD	High side to pin 1 (grid) of 12AU6 (V5). Low side to chassis.	10.7MC (450KC Swp)	FM	Point of non-interference.	Vert. amp. to point (A). Low side to chassis.	A8	Adjust for curve of maximum amplitude and symmetry similar to Fig. 1.
5.	"	"	"	"	"	Vert. amp. to point (B). Low side to chassis.	A9	Adjust so that 10.7MC occurs at center of crossover lines similar to Fig. 2. SLIGHTLY retouch A8 for maximum amplitude and straightness of crossover lines.
6.	"	High side to pin 1 (grid) of 12BA6 (V4). Low side to chassis.	"	"	"	Vert. amp. to point (C). Low side to chassis.	A10, A11	Adjust for curve of maximum amplitude and symmetry similar to Fig. 1.
7.	"	High side to pin 1 (grid) of 12BA6 (V3). Low side to chassis.	"	"	"	"	A12	"
8.	"	High side to pin 2 (grid) of 12AT7 (V2). Low side to chassis.	"	"	"	"	A13, A14	"

FM RF ALIGNMENT

Use 2 Meg resistor in series with DC probe of VTVM.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
9.	270Ω carbon resistor	High side thru 270Ω to FM antenna terminal. Low side to chassis.	98MC (unmod)	FM	98MC	DC probe to point (C). Common to chassis.	A15, A16	Adjust in order given for maximum deflection.

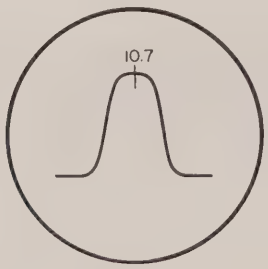


FIG. 1

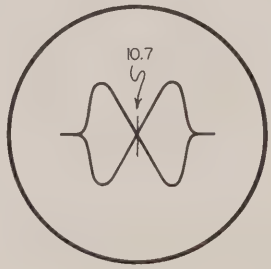


FIG. 2

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	FM RF Amplifier	12BA6	
V2	Mixer-Osc.	12AT7	
V3	1st IF Amplifier	12BA6	
V4	2nd IF Amplifier	12BA6	
V5	Limiter	12AU6	
V6	Discriminator-AM Det. - AF Amplifier	19T8	
V7	Output	35C5	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA ZENITH PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	■80	150	22-1757	AFH2-19	XB004	FP216	TMD-16	D-085	TVL-3440
B	▲40	150							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

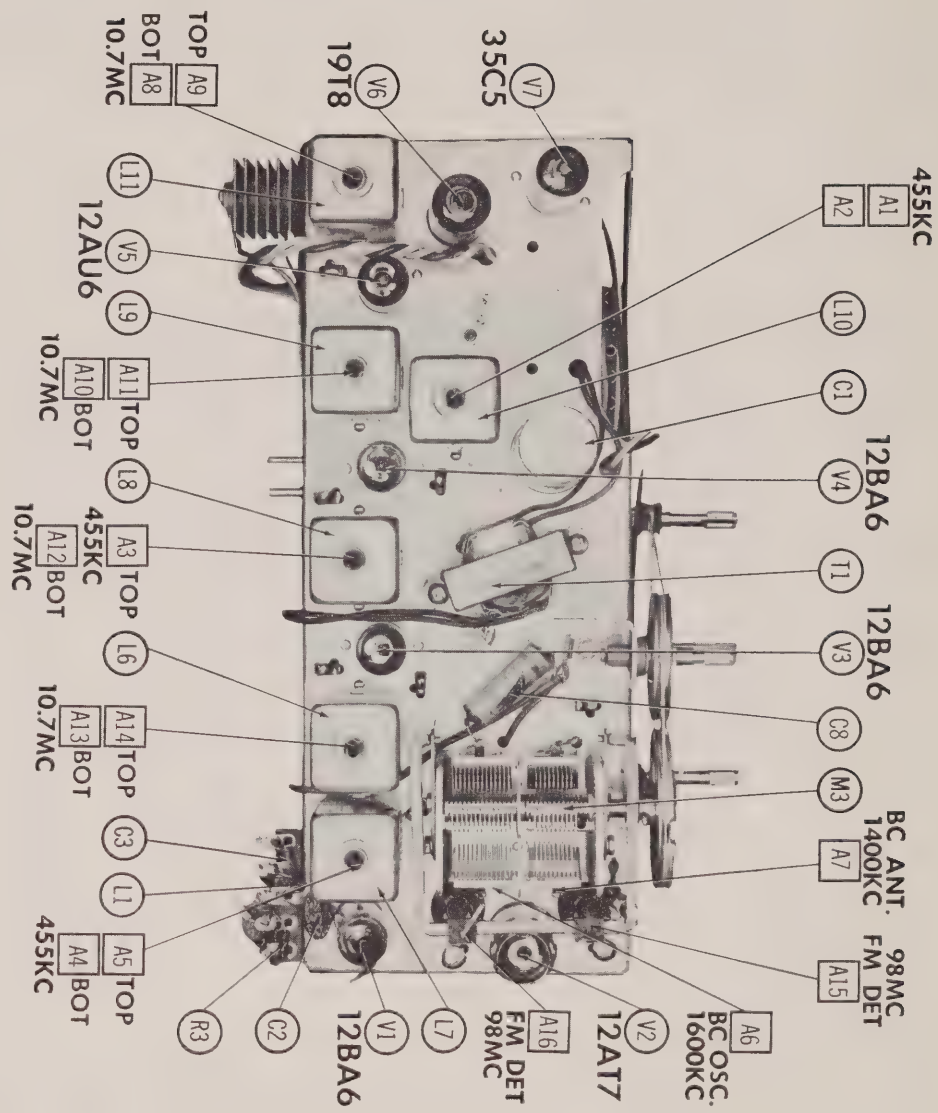
ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA ZENITH PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C2	10000		22-3	BPD-01	DD-103	K082	811-01	DC511	5HK-S1	
C3	7.5		22-1852							
C4	100		22-5	BPD-0001	DD-101	G042	801-101	UC-531	5GA-T1	
C5	1000		22-1676	SI1000	D6-102	TP52	GP2L-102	UC-521	5GA-D1	
C6	1000		22-1676	SI1000	D6-102	TP52	GP2L-102	UC-521	5GA-D1	
C7	22		22-1506							
C8	.047	200	22-2792	BPD-05	DF-503	CUB2S47		PT4147	2TM-S47	
C9	.047	200	22-2792	BPD-05	DF-503	CUB2S47		PT4147	2TM-S47	
C10	1000		22-1676	1464-001		1R5D1		MCE255	MS-21	
C11	.68		22-1766		TCZ-R68	TZ02	NP0A-R68			
C12	50		22-1367	N330-SI47	TCA-47		N330L-470			
C13	22		22-1506							
C14	10000		22-3	BPD-01	DD-103	K082	811-01	DC511	5HK-S1	
C15	10000		22-3	BPD-01	DD-103	K082	811-01	DC511	5HK-S1	
C16	100		22-5	BPD-0001	DD-101	G042	801-101	UC-531	5GA-T1	
C17	10000		22-3	BPD-01	DD-103	K082	811-01	DC511	5HK-S1	
C18	4700		22-14	BPD-0047	DD-472	K079	811-0047	UC-5247	5HK-D47	
C19	2200		22-18	BPD-0022	D6-222	K073	811-0022	UC-522	5HK-D22	
C20	10000		22-3	BPD-01	DD-103	K082	811-01	DC511	5HK-S1	
C21	25		22-1887	SI25	D6-250	TP25	GP1K-250	UC-5425	5GA-Q25	
C22	10000		22-3	BPD-01	DD-103	K082	811-01	DC511	5HK-S1	
C23	100		22-17	BPD-0001	DD-101	G042	801-101	UC-531	5GA-T1	
C24	10000		22-3	BPD-01	DD-103	K082	811-01	DC511	5HK-S1	
C25	470		22-6	BPD-00047	DD-471	K060	811-471	UC-5347	5GA-T47	
C26	4700		22-14	BPD-0047	DD-472	K079	811-0047	UC-5247	5HK-D47	
C27	.047	200	22-2795	BPD-05	DF-503	CUB2S47		PT4147	2TM-S47	
C28	10000		22-3	BPD-01	DD-103	K082	811-01	DC511	5HK-S1	
C29	10000		22-3	BPD-01	DD-103	K082	811-01	DC511	5HK-S1	
C30	10000		22-3	BPD-01	DD-103	K082	811-01	DC511	5HK-S1	
C31	10000		22-3	BPD-01	DD-103	K082	811-01	DC511	5HK-S1	
C32A	4700		22-24	BPD-2X0047	DD2-502	DK079	811-0047	DC525	5HK-2D47	
B	4700						811-0047	DC525		

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA ZENITH PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	1Meg	½	63-2143	AB-70	A47-1Meg-Z	Q13-137	U53	Volume
B	Shaft			AK-4	KSS-3	Not Req.	Not Req.	Attach to R1A
C	Switch			KB-1	SWE-12	76-1	US-26	Attach to R1A
R2A	500K	½	63-2144	AB-617	A47-500K-S	Q11-133	U50	Tone (Note 1)
B	Shaft			AK-4	KSS-3	Not Req.	Not Req.	Attach to R2A

Note 1: Used in chassis 7Y02 only.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	ZENITH PART No.	IRC PART No.	
R3	2.2Meg		63-1926	BTS-2.2Meg	
R4	220Ω		63-1758	BTS-220	
R5	220Ω		63-1758	BTS-220	
R6	1000Ω		63-1786	BTS-1000	
R7	10K		63-1828	BTS-10K	
R8	2200Ω		63-1800	BTS-2200	
R9	220Ω		63-1758	BTS-220	
R10	4.7Meg		63-1940	BTS-4.7Meg	
R11	4.7Meg		63-1940	BTS-4.7Meg	
R12	2.2Meg		63-1926	BTS-2.2Meg	
R13	1Meg		63-1912	BTS-1Meg	
R14	220Ω		63-1758	BTS-220	
R15	100K		63-1870	BTS-100K	
R16	220Ω		63-1758	BTS-220	
R17	100Ω		63-1744	BTS-100	
R18	47K		63-1856	BTS-47K	
R19	100K		63-1870	BTS-100K	
R20	15K		63-1835	BTS-15K	
R21	100K		63-1870	BTS-100K	
R22	150K		63-1876	BTS-150K	
R23	150K		63-1876	BTS-150K	
R24	4.7Meg		63-1940	BTS-4.7Meg	
R25	470K		63-1898	BTS-470K	
R26	470K		63-1898	BTS-470K	
R27	820Ω		63-1782	BTS-820	
R28	2200Ω		63-1800	BTS-2200	
R29	150Ω		63-1750	BTS-150	
R30	1000Ω	4	63-3296	PW4-1000	
R31	22Ω	1	63-2143	BTA-22	
R32	100K		63-1870	BTS-100K	Note 1
R33	470K		63-1898	BTS-470K	

Note 1: Not used in chassis 7Y04.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	ZENITH PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	3850Ω	3-4Ω	95-1467 ① 95-1468 ②	Z1001	A-2900	A-3856	22S45	S-51X	① Used in chassis 7Y02. ② Used in chassis 7Y04.

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	ZENITH PART No.	QUAM PART No.	RCA TYPE No.	
SP1	5 1/4"	PM	3-4Ω	49-791	52A1	217S1	

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	ZENITH PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	FM Ant. Coil	0Ω		20-355				
L2	FM RF Coil	0Ω	0Ω	S-13871				
L3	FM Osc. Coil	0Ω	0Ω	S-15733				
L4	AM Loop Ant.	3.3Ω		S-22944				Includes Cabinet Back Tap ③ .7Ω & ② 2Ω
L5	AM Osc. Coil	4.8Ω		S-22914				
L6	1st FM IF	.4Ω	.4Ω	95-1150	16-3487*	FM-251	1451	
L7	1st AM IF	4.8Ω	18Ω	95-1250	16-6666	BC-368	1312-C1	
L8	2nd FM IF & 2nd AM IF	1.6Ω 27Ω		95-1251				
L9	3rd FM IF	.4Ω	.4Ω	95-1150	16-3487*	FM-251	1451	
L10	3rd AM IF	18Ω	18Ω	95-1102	16-6770*	BC-355*	12-C6*	
L11	Discriminator	.4Ω	.4ΩCT	95-1153				

* Use adaptor plate.

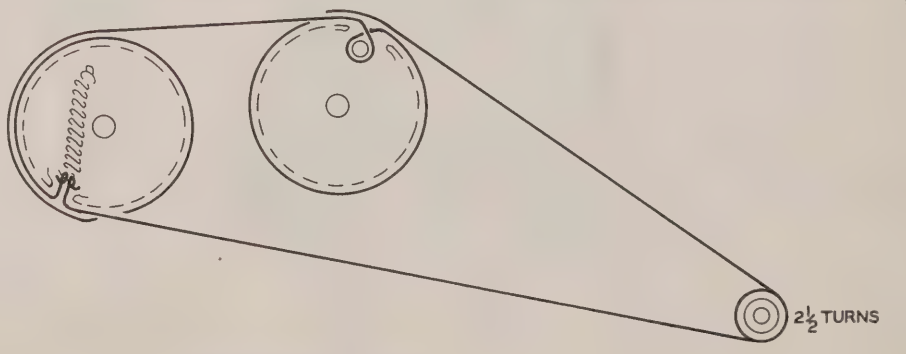
PARTS LIST AND DESCRIPTIONS (Continued)

SELENIUM RECTIFIER

ITEM No.	RATING	REPLACEMENT DATA						NOTES
	CURRENT	ZENITH PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	MALLORY PART No.	RADIO RECEPTOR PART No.	SARKES TARZIAN PART No.	
M1	.071A	212-13	1101A	RS100	6S100	5M1	100A	

MISCELLANEOUS

ITEM No.	PART NAME	ZENITH PART No.	NOTES
M2	Pilot Light	100-105	#NE51. Chassis 7Y02 only.
M3	Tuning Cap.	22-1742	2 Gang (19-460MMF, 15-185MMF)
M4	Switch	85-481	AM-FM (6 Pole - 2 Position; Rotary, Wafer Type)
	Cabinet	14-1273	Model Y724R
	Cabinet	14-1398	Model Y724G
	Cabinet	14-1880	Model Y724W
	Cabinet	14-1350	Model Y723R
	Cabinet	14-1879	Model Y723W
	Cabinet	14-1908	Model Y723G
	Handle	36-90	Model Y724W
	Handle	36-91	Model Y724R
	Handle	36-134	Model Y724G
	Knob	46-901	Tone. Model Y724R
	Knob	46-965	Tone. Model Y724G
	Knob	46-1456	Tone. Model Y724W
	Knob	46-1309	Tuning. Models Y724G, R, W.
	Knob	46-1450	Tuning. Models Y723G, R, W.
	Knob	46-1451	AM-FM Switch. Models Y724G, R, W.
	Knob	46-1454	AM-FM Switch. Models Y723G, R, W.
	Knob	46-1452	On-Off-Volume. Models Y724G, R, W.
	Knob	46-1455	On-Off-Volume. Models Y723G, R, W.
	Dial Scale	26-463	Models Y724G, R, W.
	Dial Pointer	59-251	Models Y724G, R, W.
	Dial Pointer	59-315	Model Y723R
	Dial Pointer	59-316	Model Y723W
	Dial Pointer	59-317	Model Y723G



TUNING GANG FULLY CLOSED

DIAL CORD STRINGING

PHOTOFACT* Folder

*TRADE MARK

ZENITH MODELS X2636E, EU, R, RU, X2670E, EU, R, RU, Y2636EUZ, EZ, RUZ, RZ, Y2670EUZ, EZ, RUZ, RZ, (Ch. 17X23)

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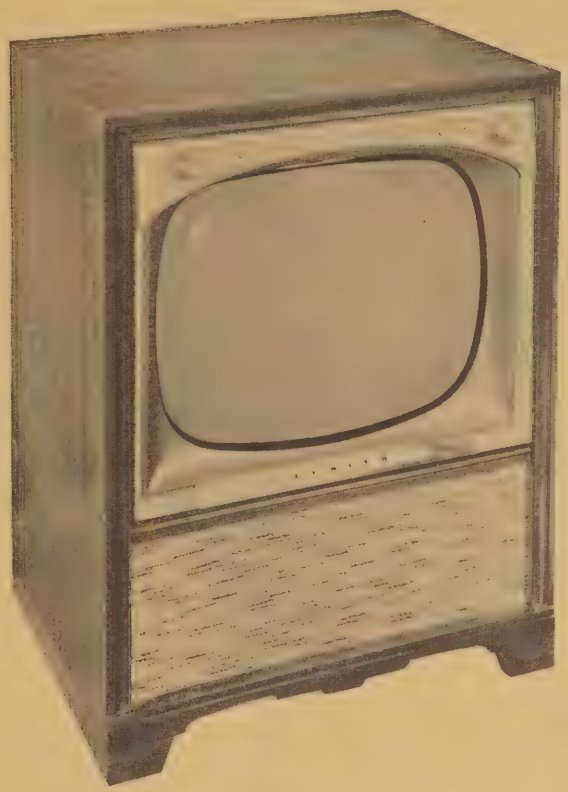

F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

ZENITH MODEL Y2670RZ

TRADE NAME	Zenith	MODELS	CHASSIS
		X2636E, EU, R, RU, X2670E, EU, R, RU, Y2636EUZ, EZ, RUZ, RZ, Y2670EUZ, EZ, RUZ, RZ	17X23
MANUFACTURER	Zenith Radio Corp., 6001 Dickens Ave., Chicago 39, Illinois		
TYPE SET	Television Receiver		
TUBES	Seventeen		
POWER SUPPLY	110-120 Volts AC-60 Cycle	RATING 1.6 Amp. @ 117 Volts AC	
TUNING RANGE	Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)		

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DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

1. Remove channel selector -fine tuning and off/on volume control knobs.

2. Remove 4 wood screws (2 on each side) exposed by knob removal.

3. Remove 2 metal screws holding name plate at the bottom edge of the safety glass. Remove name plate and safety glass. Remove 2 wood screws now exposed.

4. Remove 9 wood screws. Remove rear cover.

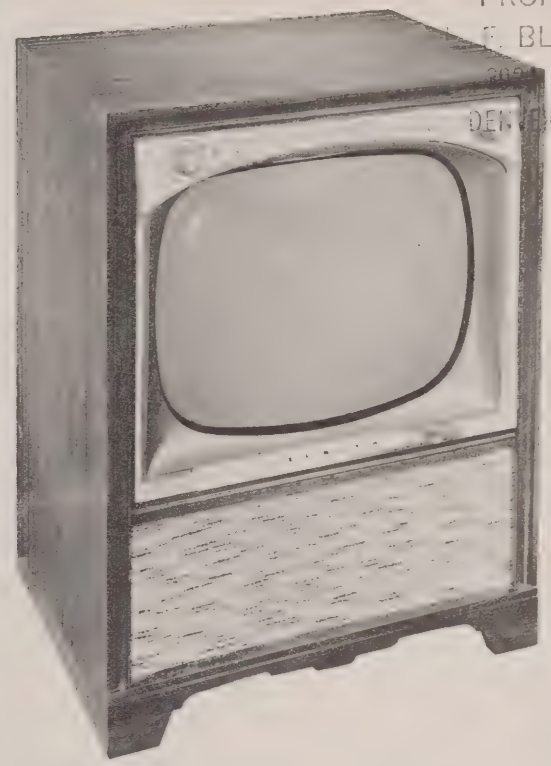
5. Disconnect speaker leads.

6. Remove 4 metal screws (2 at the top of chassis and 2 at the bottom of chassis) from chassis brackets.

7. Remove 1 chassis bolt and 1 metal screw from the bottom right corner of chassis.

8. Remove entire assembly from front of cabinet.

9. Remove 4 speaker nuts. Remove speaker.



MODEL	CHASSIS
Y2670RZ	17X23

ZENITH MODELS X2636E, EU, R, RU, X2670E, EU, R, RU, Y2636EUZ, EZ, RUZ, RZ, Y2670EUZ, EZ, RUZ, RZ, (Ch. 17X23)

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustments of the VHF tuner oscillator circuit may be accomplished by removing the channel selector and fine tuning knobs.

PICTURE TUBE SAFETY GLASS CLEANING

Remove 2 metal screws at the bottom edges of the safety glass holding name plate. Remove plate and tilt safety glass out at bottom and remove. Use extreme caution when removing safety glass.

SERVICE ADJUSTMENT LOCATION

See tube placement chart on page 5.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

For adjustment of the horizontal frequency slug (B1) it is necessary to remove the rear cover and supply power to the set.

Set the horizontal hold control at the center of its range and adjust B1 until the picture synchronizes horizontally.

SOUND IF DETECTOR BUZZ ADJUSTMENT

Adjust the buzz control located on tube side of the chassis for maximum volume and MINIMUM buzz.

FUSES

One fuse is used for horizontal sweep circuit protection. (For location see tube placement chart).

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube, located flush against the deflection yoke. Rotate the two rings around the neck of the tube until the picture is properly centered.

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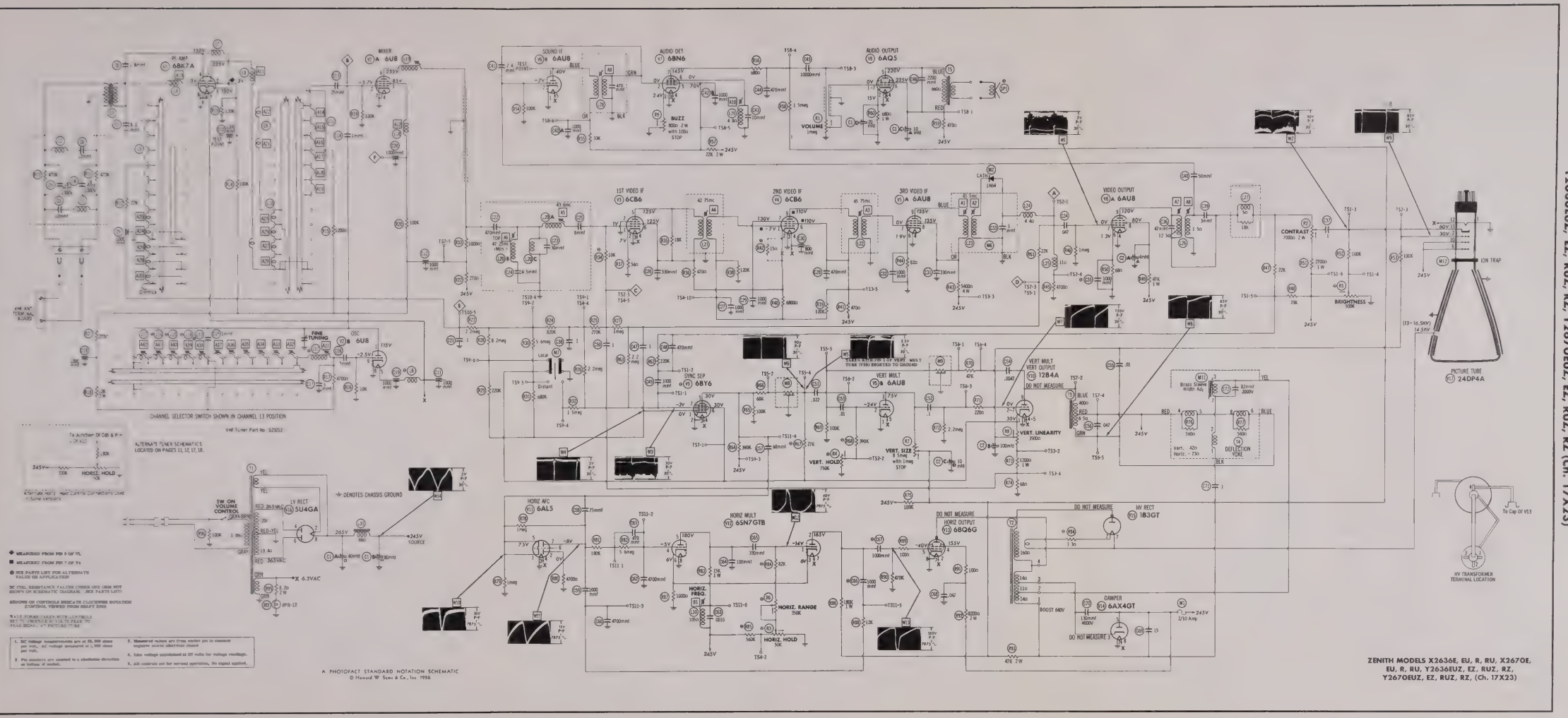

ZENITH MODELS X2636E, EU, R, RU, X2670E, EU, R, RU, Y2636EUZ, EZ, RUZ, RZ, Y2670EUZ, EZ, RUZ, RZ (Ch. 17X23)

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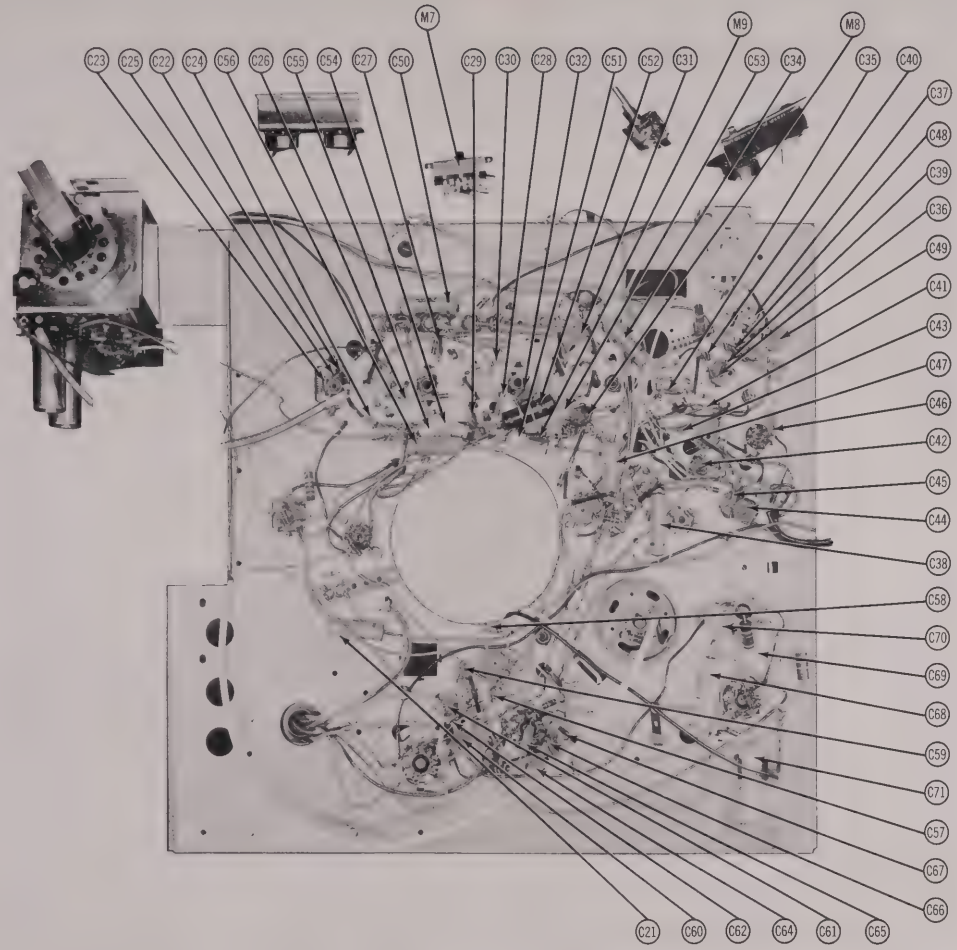

CHASSIS BOTTOM VIEW-CAPACITOR AND ALIGNMENT IDENTIFICATION

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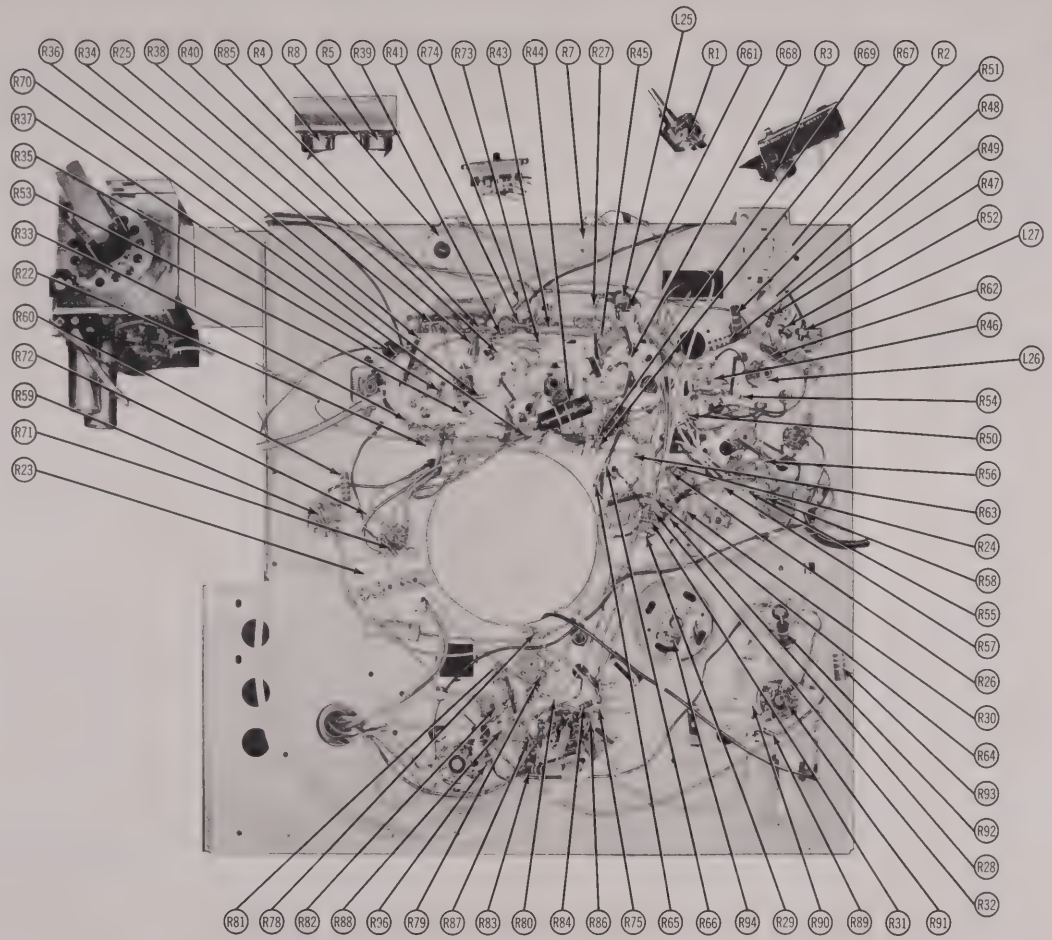

CHASSIS BOTTOM VIEW-RESISTOR AND INDUCTOR IDENTIFICATION

TUBE PLACEMENT CHART

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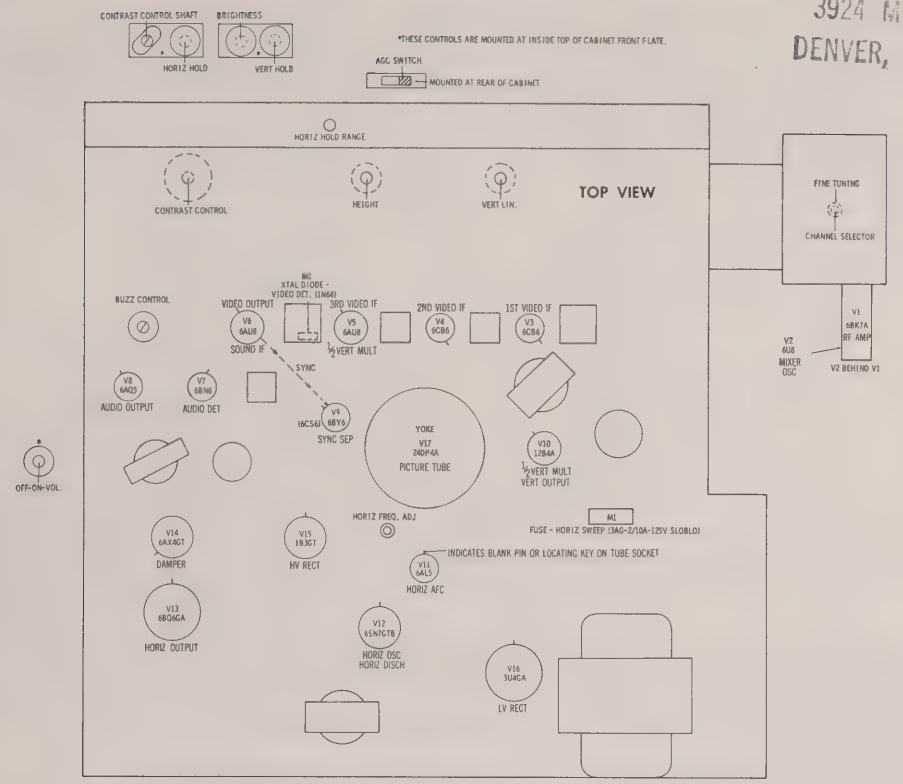


TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - V16

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - V2, V3, V4, V5, V6
No pic, no sound, has snow - V1, V2, V3
No pic, has sound, has raster - V6, V17
Has pic, no sound - V6, V7, V8

SYNC FAILURE
No vert. sync - V5, V9, V10
No horiz. sync - V9, V11, V12
No vert. or horiz. sync - V9

SWEEP FAILURE
No raster, has sound - V12, V13, V14, V15, V17, Fuse (M1)
No vertical deflection - V5, V10
Poor vert. linearity or foldover - V5, V10
Poor horiz. linearity or foldover - V12, V13, V14
Narrow picture - V12, V13, V14, V15, V16
Vert. off freq. - V5, V9, V10
Horiz. off freq. - V9, V11, V12

ZENITH MODELS X2636E, EU, R, RU, X2670E, EU, R, RU, Y2636EUZ, EZ, RUZ, RZ, Y2670EUZ, EZ, RUZ, RZ (Ch. 17X23)

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage lead should be securely taped and kept away from chassis. Do not remove the horizontal multivibrator tube (V12) to disable the high voltage.

VIDEO IF ALIGNMENT

Remove the oscillator-mixer tube (V2) from its socket and connect a wire to pin 9. Replace V2 in its socket and connect a clip lead from loose end of wire to chassis. Connect the negative lead of a 5 volt bias supply to point Ⓒ. Connect positive lead to chassis. Connect a clip lead from point Ⓓ to chassis. In step 6, attenuate sweep generator output to maintain not more than 3 volts peak to peak on scope. Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	470MMF	High side to point Ⓑ. Low side to chassis.	Not used.	45. 5MC (unmod)	Any	Use VTVM. DC probe to point Ⓐ thru 10K. Common to chassis.	A1, A2	Attenuate generator output to maintain not more than -2 volts at VTVM.
2.	"	"	"	45. 75MC	"	"	A3	"
3.	"	"	"	42. 75MC	"	"	A4	"
4.	"	"	"	43. 6MC	"	"	A5	"
5.	"	"	"	47. 25MC	"	"	A6	Increase generator output for useable reading on VTVM. Adjust for MINIMUM deflection. Repeat steps 1 thru 5.
6.	"	"	43MC (10MC Swp)	41. 25MC 42. 75MC 45. 0MC 45. 75MC 47. 25MC	"	Vert. amp. thru 10K to point Ⓐ. Low side to chassis.		Check for response similar to Fig. 1. If necessary, retouch A1 thru A5 to obtain desired response. Adjust A3 for maximum amplitude of response curve and position of 45. 75MC marker. Adjust A4 for position of 42. 75MC marker. A1 and A2 affect bandwidth. A5 affects top portion of curve. Increase sweep output and check position of 47. 25MC trap. If necessary, SLIGHTLY retouch A6 for correct position of 47. 25MC marker. The 41. 25MC marker should be in proper position on curve after correct bandpass and other marker positions are obtained. Remove wire from pin 9 of V2. Disconnect the bias supply and clip lead from point Ⓓ.

SOUND IF ALIGNMENT

Connect an attenuator (Zenith part no. S-17203 or equivalent) in series with the receiver antenna.
Tune in a modulated TV signal and adjust the attenuator until the signal falls below the limiting level of the 6BN6 (limiter detector), as evidenced by a hiss similar to super-regeneration.
Adjust the sound take-off transformer (A7 and A8), the sound IF transformer (A9) and the quadrature coil (A10) for maximum sound of best quality.
Adjust the buzz control (R9) for minimum intercarrier buzz.
If during alignment of the sound IF the signal rises above the limiting level of the 6BN6 (hiss disappears), increase the attenuation until hiss returns.

VHF RF AND MIXER ALIGNMENT

Connect the negative lead of a 2 volt bias supply to point Ⓔ on tuner. Connect the positive lead to chassis.
Set the RF trimmer (A11) at its center adjustment position. All should not require further adjustment unless the RF tube (V1) is replaced. (In some tuners A11 is a coil and is adjusted by compressing and expanding coil turns.)
Preset A38 at its center adjustment position. In step 14 adjustment A22 is not necessary if proper bandpass is obtainable by adjusting A21.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
7.	Fig. 2	Across antenna terminals thru matching network (Fig. 2).	213MC (10MC Swp)	211. 25MC 215. 75MC	13	Vert. amp. thru 10K to point Ⓕ. Low side to chassis.	A12, A13	Check for response curve similar to Fig. 3. If necessary, adjust A12 by expanding or compressing coil turns for proper bandwidth. Adjust A13 by expanding or compressing coil turns for maximum amplitude of response curve.
8.	"	"	207MC (10MC Swp)	205. 25MC 209. 75MC	12	"	A14	Check for response curve similar to Fig. 3. If necessary, adjust by bending loop in or out from switch rotor for proper response.
9.	"	"	201MC (10MC Swp)	199. 25MC 203. 75MC	11	"	A15	"
10.	"	"	195MC (10MC Swp)	193. 25MC 197. 75MC	10	"	A16	"
11.	"	"	189MC (10MC Swp)	187. 25MC 191. 75MC	9	"	A17	"
12.	"	"	183MC (10MC Swp)	181. 25MC 185. 75MC	8	"	A18	"
13.	"	"	177MC (10MC Swp)	175. 25MC 179. 75MC	7	"	A19	"
14.	"	"	85MC (10MC Swp)	83. 25MC 87. 75MC	6	"	A20, A21, A22	Adjust A21 and A22 for correct bandpass. Adjust A20 for maximum amplitude similar to Fig. 3. A20, A21 and A22 are adjusted by expanding or compressing coil turns.
15.	"	"	79MC (10MC Swp)	77. 25MC 81. 75MC	5	"	A23, A24	Adjust by expanding or compressing coil turns for response curve similar to Fig. 3.
16.	"	"	69MC (10MC Swp)	67. 25MC 71. 75MC	4	"	A25, A26	"
17.	"	"	63MC (10MC Swp)	61. 25MC 65. 75MC	3	"	A27 A28	"
18.	"	"	57MC (10MC Swp)	55. 25MC 59. 75MC	2	"	A29, A30	"

ALIGNMENT INSTRUCTIONS (cont)

VHF OSCILLATOR ALIGNMENT

Connect bias as under "Video IF Alignment". Set the fine tuning control to the position where the brass flat shaft is in a horizontal position. Leave it at this mid-range position during entire alignment.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
19.	Fig. 2	Across antenna terminals thru matching network (Fig. 2).	213MC (10MC Swp)	211. 25MC 215. 75MC	13	Vert. amp. thru 10K to point (A). Low side to chassis.	A31	Adjust to place video marker at 50% on response curve as shown in Fig. 4. Sound marker should be at 50%.
			207MC (10MC Swp)	205. 25MC 209. 75MC	12		A32	
			201MC (10MC Swp)	199. 25MC 203. 75MC	11		A33	
			195MC (10MC Swp)	193. 25MC 197. 75MC	10		A34	
			189MC (10MC Swp)	187. 25MC 191. 75MC	9		A35	
			183MC (10MC Swp)	181. 25MC 185. 75MC	8		A36	
			177MC (10MC Swp)	175. 25MC 179. 75MC	7		A37	
			85MC (10MC Swp)	83. 25MC 87. 75MC	6		A38	
			79MC (10MC Swp)	77. 25MC 81. 75MC	5		A39	
			69MC (10MC Swp)	67. 25MC 71. 75MC	4		A40	
			63MC (10MC Swp)	61. 25MC 65. 75MC	3		A41	
			57MC (10MC Swp)	55. 25MC 59. 75MC	2		A42	

UHF TUNER ALIGNMENT

Alignment of the UHF tuner should not be attempted unless proper test equipment is available.
Switch the receiver to UHF position. Connect the negative lead of a 2 volt bias supply to point (C). Connect positive lead to chassis.
Adjust the sweep generator output to provide 3 volt peak to peak on scope.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
20.	Fig. 5	Across antenna terminals thru matching network (Fig. 5).	713MC (10MC Swp)	711. 25MC	54	Vert. amp. thru 10K to point (A). Low side to chassis.	A43, A44, A45	Tuner rocker arm should be in the horizontal position. If necessary, loosen set screw and adjust tuner so that rocker arm is horizontal when the channel indicator is set to channel 54. Do not adjust A43 unless oscillator calibration is off more than 3 channels. If necessary, adjust A43 to place video marker at 50% on response curve as in Fig. 4. The image (weaker response) will appear also. The response toward the counter clockwise position of A43 is the proper response. Adjust A44 and A45 for maximum amplitude of response similar to Fig. 4.
21.	"	"	473MC (10MC Swp)	471. 25MC	14	"		Check for response curve similar to Fig. 4. If oscillator is off more than 3 channels adjust the oscillator travel adjustment (osc., mixer and antenna travel adjustments are the three round thumb screws on top of tuner) to scale. Care must be used in making this adjustment so as not to move the rocker arm out of its bearing. Set the mixer and antenna travel adjustments for maximum response on scope.
22.	"	"	887MC (10MC Swp)	885. 25MC	83	"	A46, A47, A48	Adjust A46 to place marker at 50% as in Fig. 4. Adjust A47 and A48 for maximum amplitude and symmetry of response similar to Fig. 4.

UHF IF INTERSTAGE AND INPUT COIL ADJUSTMENTS

Tune in a local TV station operating on a UHF frequency. Adjust A49 and A50 for best noise free picture.

UHF ADAPTER ALIGNMENT PART #S-22790

This portion has been properly aligned at the factory and is very stable. Alignment of this portion should not be required in the field.

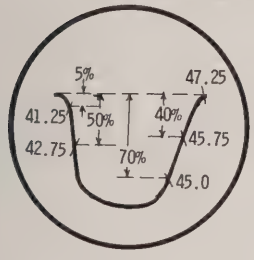
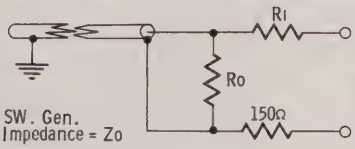


FIG. 1



Zo	Ro	R1
50Ω	50Ω	120Ω
75Ω	82Ω	110Ω
92Ω	110Ω	100Ω

FIG. 2

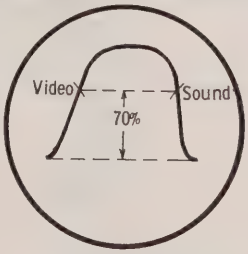


FIG. 3

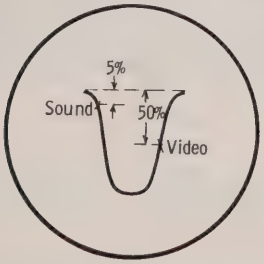


FIG. 4

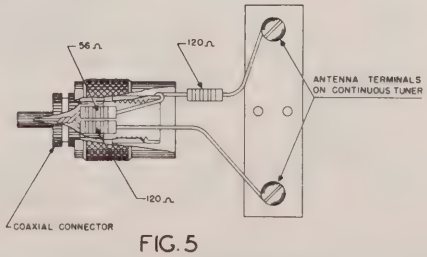
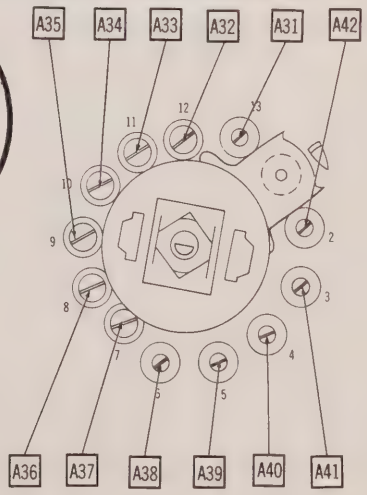


FIG. 5

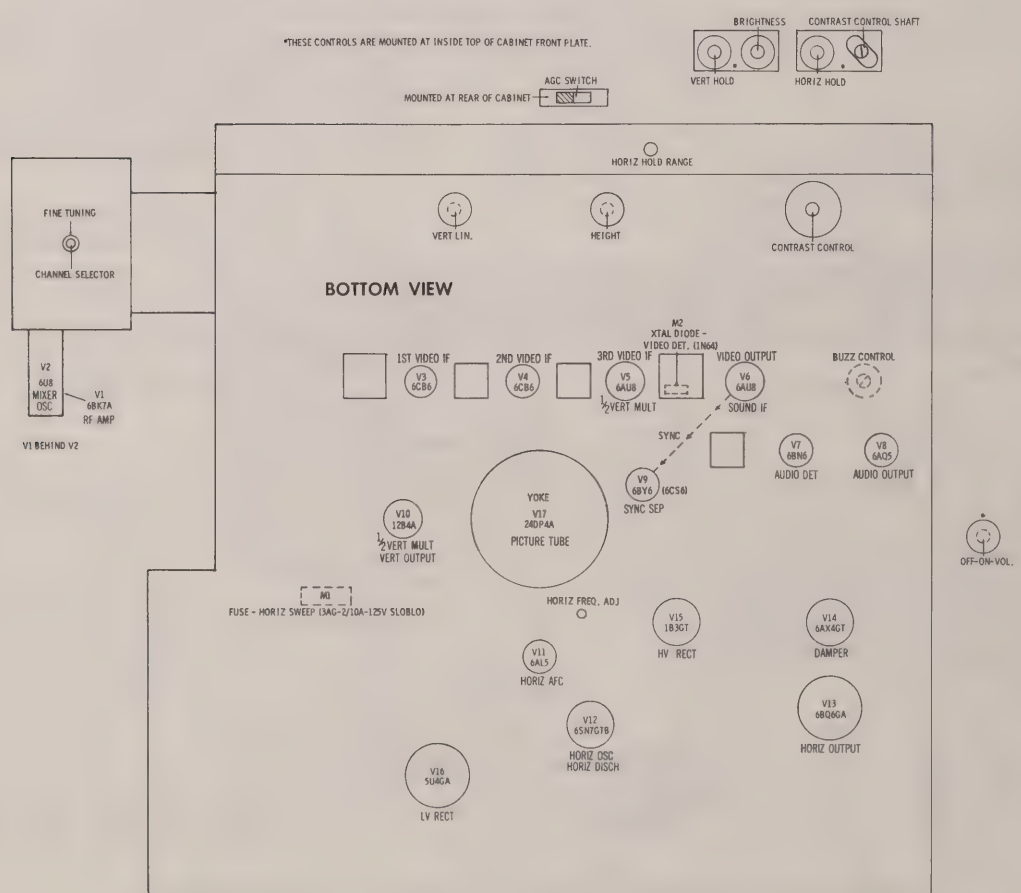


ZENITH MODELS X2636E, EU, R, RU, X2670E, EU, R, RU, Y2636EUZ, EZ, RUZ, RZ, Y2670EUZ, EZ, RUZ, RZ (Ch. 17X23)

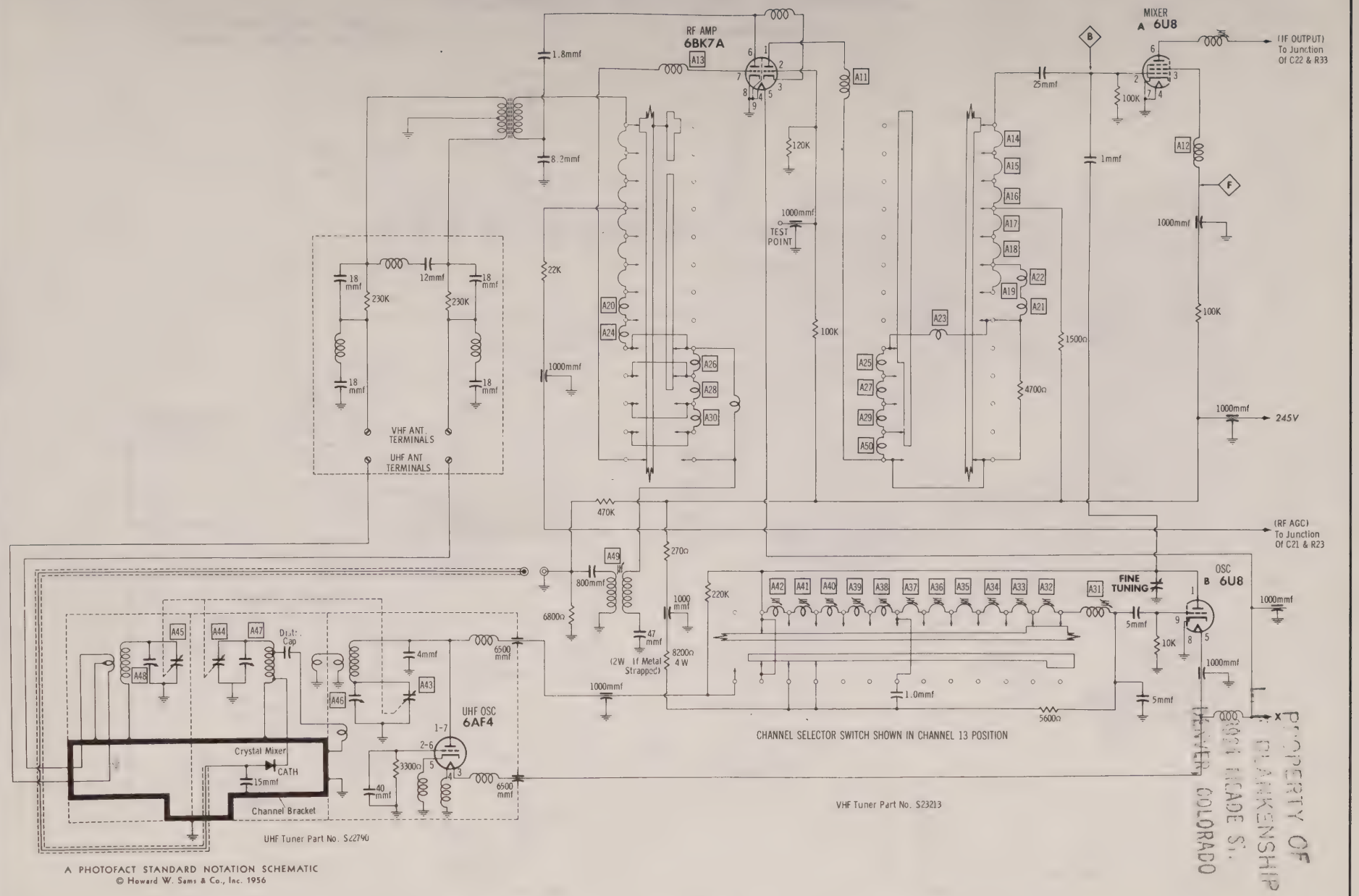
RESISTANCE MEASUREMENTS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	6BK7A	†1500Ω	60K	INF	0Ω	.1Ω	INF	3Meg	0Ω	0Ω
V2	6U8	†10K	100K	†100K	0Ω	.1Ω	†1300Ω	0Ω	0Ω	10K
V3	6CB6	700K	56Ω	0Ω	.1Ω	▲ 470Ω	▲ 470Ω	0Ω		
V4	6CB6	60K	70K	0Ω	.1Ω	†530Ω	†530Ω	70K		
V5	6AU8	0Ω	● 550K	● ▰4.5Meg	0Ω	.1Ω	82Ω	.3Ω	†5400Ω	†5400Ω
V6	6AU8	0Ω	100K	†55K	0Ω	.1Ω	68Ω	1Meg	†47K	†8000Ω
V7	6BN6	350Ω	.4Ω	0Ω	.1Ω	†22K	4.8Ω	▰1.5Meg		
V8	6AQ5	● 500K	680Ω	0Ω	.1Ω	†1000Ω	†530Ω	● 500K		
V9	6BY6	220K	0Ω	0Ω	.1Ω	†90K	● 1800Ω	1Meg		
V10	12B4A	● 1800Ω	2.2Meg	0Ω	.1Ω	.1Ω	TP	2.2Meg	TP	†460Ω
V11	6AL5	1Meg	4700Ω	0Ω	.1Ω	1Meg	NC	2Meg		
V12	6SN7GTB	● 100K	▰ 220K	1000Ω	7Meg	†15K	1000Ω	.1Ω	0Ω	
V13	6BQ6GA	TP	.1Ω	NC	†8300Ω	470K	TP	0Ω	0Ω	TOP CAP ▲ 14Ω
V14	6AX4GT	TP	NC	200K	NC	†66Ω	NC	0Ω	.1Ω	
V15	1B3GT	PINS 1 - 8 HAVE INF RESISTANCE								TOP CAP ▰ 275Ω
V16	5U4GA	NC	60K	TP	20Ω	NC	18Ω	TP	60K	
V17	24DP4A	0Ω	100K	PIN 6 †66Ω	PIN 10 †66Ω	PIN 11 ● †200K	PIN 12 .1Ω			

† MEASURED FROM PIN 8 OF V16.
▲ MEASURED FROM PIN 7 OF V4.
● THIS READING WILL VARY. CONTROL SET FOR NORMAL OPERATIONS.
▰ MEASURED FROM PIN 3 OF V14.
TP TIE POINT
NC NO CONNECTION.



TUBE PLACEMENT CHART



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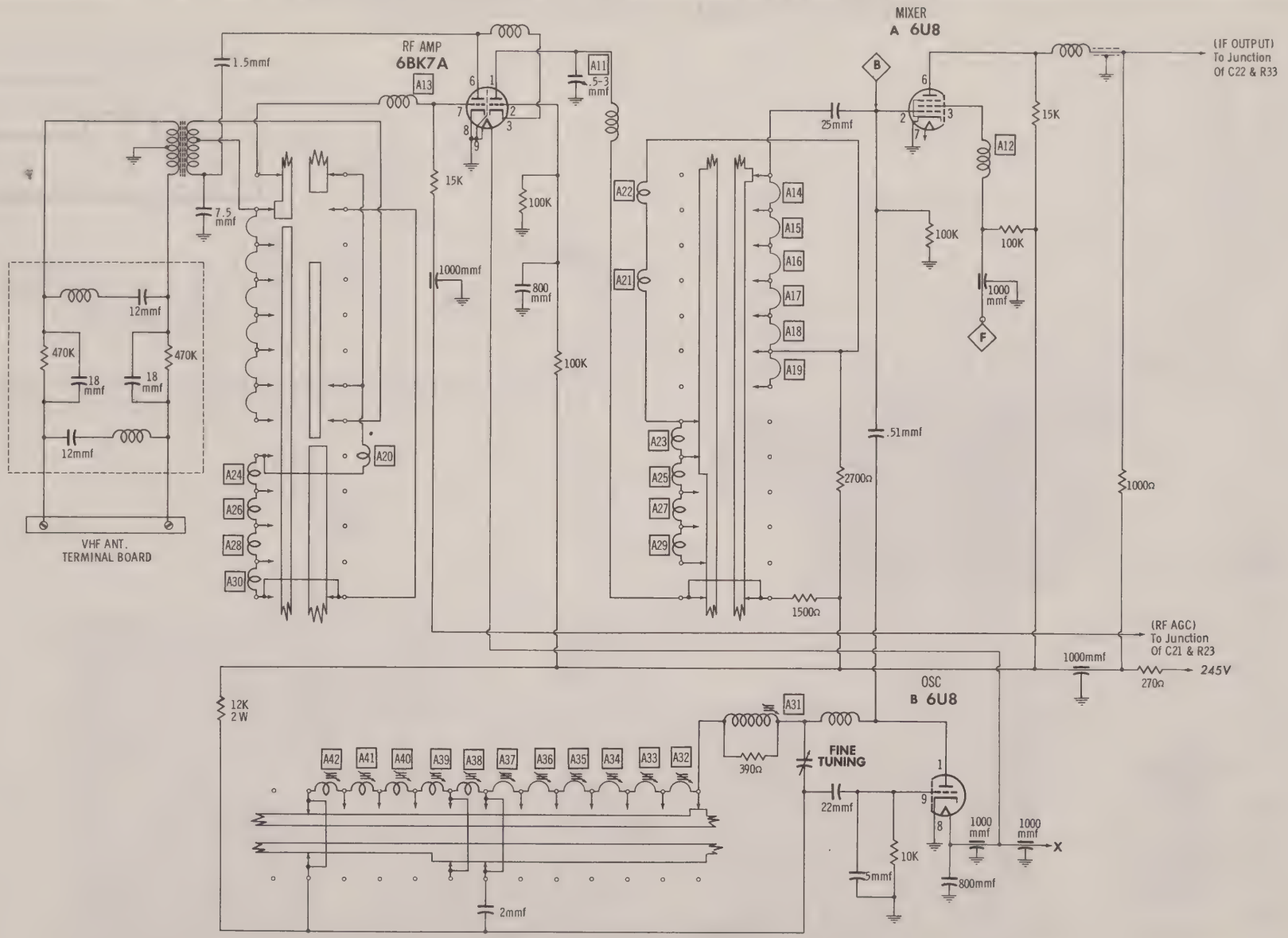
ALTERNATE VHF-UHF TUNER SCHEMATIC

ZENITH MODELS X2636E, EU, R, RU, X2670E, EU, R, RU, Y2636EUZ, EZ, RUZ, RZ, Y2670EUZ, EZ, RUZ, RZ (Ch. 17X23)



A PHOTOFACT STANDARD NOTATION SCHEMATIC

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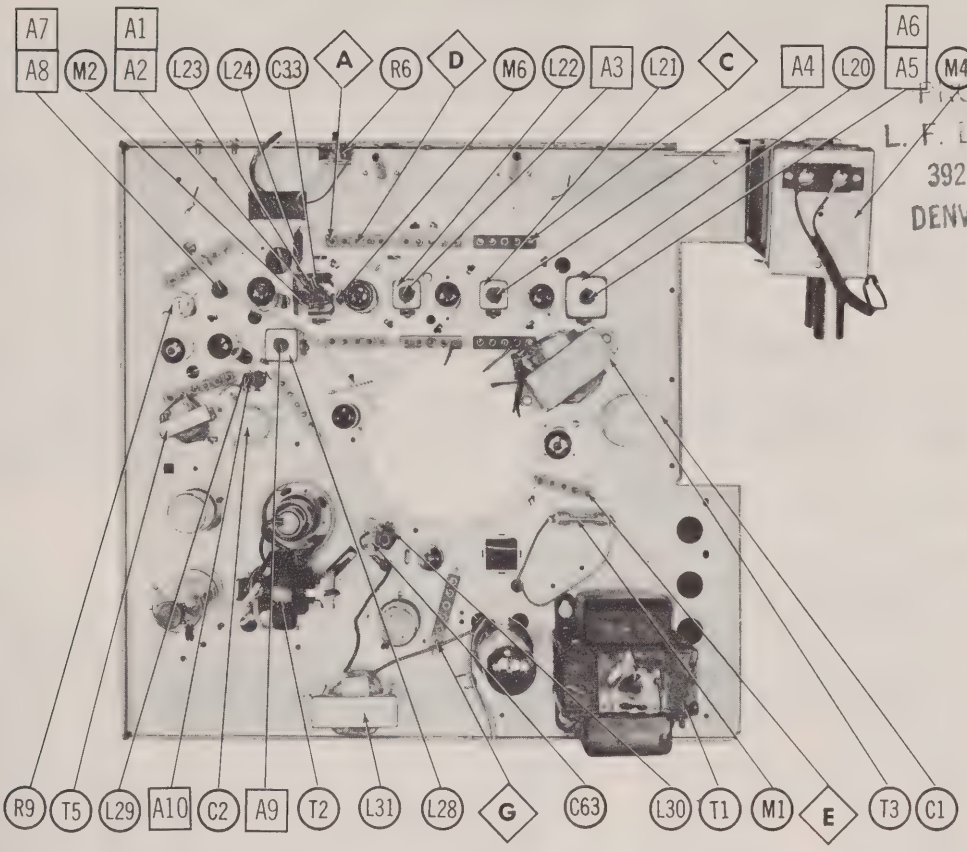
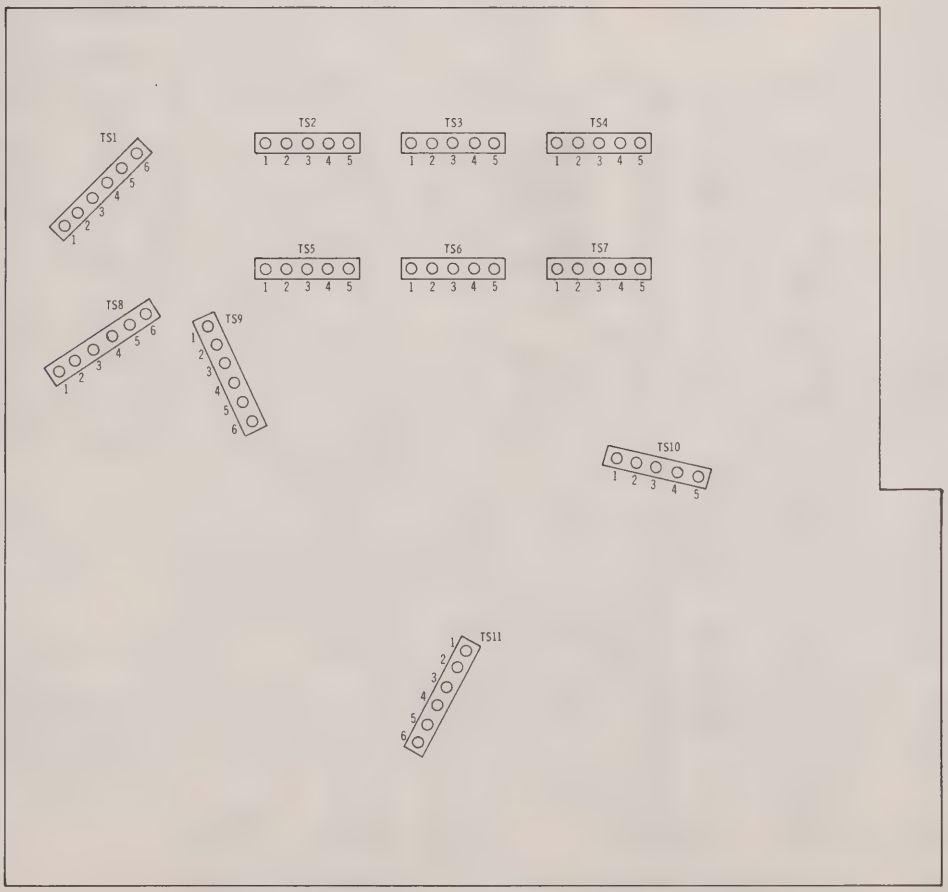
VHF Tuner Part No. S22778

ALTERNATE VHF TUNER SCHEMATIC



CHASSIS TOP VIEW



TERMINAL LOCATION CHART

SET 338 FOLDER 12

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No	USE	TYPE	NOTES
V1	IF Amplifier	6BA7A	
V2	Mixer-Oscillator	6U8	
V3	1st Video IF Amplifier	6CB6	
V4	2nd Video IF Amplifier	6CB6	
V5	3rd Video IF Amplifier	6AU8	
V6	Vert. Multi Video Output-Sound IF Amplifier	6AU8	
V7	Audio Detector	6BN8	
V8	Audio Output	6AQ5	
V9	Sync Separator	6BY6	Note 1
V10	Vert. Mult - Vert. Output	12DA4	
V11	Horiz. AFC	6AL5	
V12	Horiz. Mult.	6DN7GTB	
V13	Horiz. Output	6DQ6GA	
V14	Damper	6AX4GT	
V15	HV Rectifier	1B3GT	
V16	LV Rectifier	5U4GA	

Note 1. 6J6 may be used in some versions.

PICTURE TUBE

ITEM No	REPLACEMENT DATA				NOTES
	ZENITH PART No.	RS PART No.	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	
V17	24DP4A ①	24DP4A ①	24DP4A ① 24DP4	24DP4A ① 24DP4	① Aluminized Silver screen 85

ELECTROLYTIC CAPACITORS

ITEM No	RATING CAP.	VOLT	REPLACEMENT DATA ZENITH PART No.	ALLOVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	TYFAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	40	400	12-3547	AP34-40-450		FP43L-4	TMT-43	C-Q-385	KB11Y *
B	80	400				TC75	TD-35-35	MT-4540	
C	40	400							
D	20	25							
C2A	4	350	22-3548	AP33-180				T-BM	RS11S *
B	30	30						MT-4504	
C	40	475							

* Non-catalog item

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No	RATING CAP	VOLT	REPLACEMENT DATA ZENITH PART No.	ALLOVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C1	12		22-3579			TCS-12	TEJ0	NP0K-120		
C2	18	1000	22-3580							
C3	18	1000	22-3582		TCS-18	TEJ0	NP0K-180			
C4	22		22-3579							
C5	8.2		22-3581		NP0-DIS.3		NP0A-8R2			
C6	1.0		22-3421							
C7	1000		22-3733							
C8	1000		22-3877							
C9	1000		22-3733							
C10	1000		22-3733							
C11	30		22-3571		TCS-30	N030	N150K-300			
C12	33		22-3720		TCS-1	TE03	NP0A-010			
C13	1		22-1714							
C14	1		22-1715							
C15	8		22-3716							
C16	1000		22-3733							
C17	1000		22-3733							
C18	1000		22-3733							
C19	30	300	22-1771	P38N-1	DF-104	CUB2P1		PT401	2TM-P1	
C20	30		22-1771		DD-401	CUB4P1		PT4G7	4TM-P1	
C21	470		22-0	P50-0047	DD-471	KD50	5LL-471	UC-5347	5GA-T47	
C22	470				DD-471	KD50				
C23	1000						WP01-300			
C24	4.5		22-3506							
C25	8		22-3681		NP0-DIS.3	3015	NP0A-8R2			
C26	330				S330	D5-331	TP43	5LL-331	UC-5333	5GA-T33
C27	1000		22-?		BP0-001	DD-102	KD60	5LL-001	DC-531	5HK-D1
C28	470		22-3302		S470	D5-471	TP46	5LL-471	UC-5347	5GA-T47
C29	1000		22-?		BP0-001	DD-102	KD60	501-001	DC-531	5HK-D1
C30	1000		22-3577							
C31	330	500	22-1045		S330	D5-331	TP43	5LL-331	UC-5333	1FM-333
C32	1000		22-?		BP0-001	DD-102	KD60	501-001	DC-531	5HK-D1
C33	33		22-1763		NP0-E12	TC5-1	TE03	NP0A-010		5TCCB-V1
C34	.047	300	22-1775		BP0-05	DF-503	CUB3E47		PT4G47	3TM-G47
C35	1000		22-?		BP0-001	DD-102	KD60	501-001	DC-531	5HK-D1
C36	47		22-3467							
C37	.1	200	22-1777		P38N-1	DF-104	CUB3P1		PT401	2TM-P1
C38	.1	300	22-1777		P38N-1	DF-104	CUB3P1		PT401	3TM-P1
C39	3		22-3343		NP0-E33	TC5-3R3	3D07	NP0A-020	ZY-553	
C40	10		22-3492		S10	D5-100	TP42	5LL-100	UC-545	
C41	3.6		22-3596		NP0-E3.3	TC5-3R6	TE05	NP0A-3R3		
C42A	1000		22-31		BPD-1X001	DD5-103	DE069	61S-001	DCD-631	
B	1000									
C43	30		22-3376							
C44	470		22-?		BPD-00047	DD-471	KD60	5LL-471	UC-5347	
C45	10000		22-3		BPD-01	DD-103	KD63	5LL-01	DC-551	5HK-S1
C46	1000		22-?		BPD-0033	DE-333	KD73	5LL-0033	UC-5333	5HK-D33
C47	.1	300	22-1777		P38N-1	DF-104	CUB3P1		PT401	3TM-P1
C48	470		22-?		BPD-00047	DD-471	KD60	5LL-471	UC-5347	5GA-T47
C49	3300		22-?		BPD-0033	DE-333	KD73	5LL-0033	UC-5333	5HK-D33
C50	.1	300	22-1777		P38N-1	DF-104	CUB3P1		PT401	3TM-P1
C51	.033	600	22-3631							
C52	.1	600	22-3061		P46N-1	DF-104	CUB4P1		PT601	4TM-P1
C53	.01	500	22-3346							
C54	.0047	600			1464-0047		3R5D47			MB-347
C55	.01	600	22-1646		BPD-01	DD-103	CUB4D1	GP3-333-103	PT611	4TM-S1
C56	.047	300	22-1778		BPD-05	DF-503	CUB3E47		PT4G47	3TM-S47
C57	68		22-3065		NP0-E68	D5-680	T2RSQ68	5LL-680		
C58	150				NP0-E75	D5-750	T2RSQ75	5LL-750		
C59	1000		22-?		BPD-001	DD-102	KD60	501-001	DC-531	
C60	4700		22-34		BPD-0047	DD-472	KD70	5LL-0047	UC-5347	
C61	470		22-?		BPD-00047	DD-471	KD60	5LL-471	UC-5347	
C62	4700		22-35		BPD-0047	DD-472	KD70	5LL-0047	UC-5347	
C63	.0033	200	22-3964		1464-0033		3R3D33			MB-333
C64	100		22-9		NP0-D100	DD-101	TE30	NP0-337-101	ZT-581	
C65	330	500	22-2667		1462-00033	D6-331	5R5T33	5LL-331		MB-333
C66	1000				1464-001		3R5D1	5LL-103	MCB355	MB-31
C67	1000				1464-001		3R5D1	5LL-103	MCB355	MB-31
C68	.047	400	22-1775		BPD-05	DF-503	CUB4E47		PT4Y47	4TM-S47
C69	.15	400	22-2361		P46N-15		CUB4P15		PT4Y15	4TM-P15
C70	120	4000								
C71	.1	600	22-1841		P68N-1	DF-104	CUB6P1		PT601	6TM-P1
C72	82	2000					D30D-820			

Note 1. Some versions use .0047MFD unit (part #22-3634) in this application.
Note 2. Some versions use 680MMF unit (part #22-2668) in this application.
Note 3. Some versions use 330MMF unit (part #23-3458) in this application.

PARTS LIST AND DESCRIPTIONS

CONTROLS

ITEM No	RATING RESISTANCE	WATTS	REPLACEMENT DATA ZENITH PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	1Meg	½	63-3273	B-697-S	A47-1Meg-S	QU-137	TA15L	Volume
B	Shaft		Not Req.	PS-2	Not Req.	WPXT500	Not Req.	Attach to R1A
C	Switch		Not Req.	SWK-12	76-1	UB-26	Not Req.	Attach to R1A
R2A	7000Ω	2	63-3268	V-236	A47-7Kcc	WPXT500	R7S01L	Contrast
B	Shaft		Not Req.	Not Req.	Not Req.	DB-36	Not Req.	Attach to R2A
R3A	50K	½	63-3597	AB-31	A47-50K-S	QU-133	TA54L	Horiz. Hold - Note 1
B	Shaft		Not Req.	AK-4	KH6-3	Not Req.	Not Req.	Attach to R3A
R4A	750K	½	63-3592	AB-06	A47-750K-S	QU-136	TA36L	Vert. Hold - Note 3
B	Shaft		Not Req.	AK-4	KH6-3	Not Req.	Not Req.	Attach to R4A
R5A	500K	½	63-3591	AB-59	A47-500K-S	QU-135	TA55L	Brightness - Note 3
B	Shaft		Not Req.	AK-4	KH6-3	Not Req.	Not Req.	Attach to R5A
R6A	350K	½	63-3625	AB-58	A47-500K-S	QU-139	TA55L	Horiz. Range-Note 4
B	Shaft		Not Req.	AK-1	FK8-4/4	Not Req.	Not Req.	Attach to R6A
R7A	5 Meg with 1Meg stop	½	63-3324	AB-89	sA47-7.5Meg -S	sQU-148	sPTA2S5L	Vert. Size
B	Shaft		Not Req.	AK-19	RM-3	TQ	Not Req.	Attach to R7A
R8A	350Ω	½	63-3396	AB-8	A47-400-S	QU-14	PTA25L	Vert. Linearity
B	Shaft		Not Req.	AK-19	RM-3	TQ	Not Req.	Attach to R8A
R9	800Ω	8	63-3384		39-800-50			Buss-1000 ohm-wire wound

Note 1. Some versions will use an alternate control part #63-3281.
Note 2. Some versions will use an alternate control part #63-3390.
Note 3. Some versions will use an alternate control part #63-3389.
Note 4. Not used in some versions.
a Connect a 1Meg resistor in series with the right hand terminal of the control and the lead connecting to the same terminal of the original (control viewed from shaft end, terminals down).

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No	RATING OHMS	WATT	REPLACEMENT DATA ZENITH PART No.	IRC PART No.	NOTES
R10	470K		63-1898	BTS-470K	
R11	470K		63-1898	BTS-470K	
R12	22K		63-1841	BTS-22K	
R13	120K		63-1873	BTS-120K	
R14	100K		63-1859	BTS-100K	
R15	1200Ω		63-1789	BTS-1200	
R16	10K		63-1827	BTS-10K	
R17	4700Ω		63-1814	BTS-4700	
R18	10K	2	63-3178	BTB-10K	
R19	100K		63-1859	BTS-100K	
R20	100K		63-1859	BTS-100K	
R21	270Ω		63-1761	BTS-270	
R22	270Ω		63-1761	BTS-270	
R23	2.2Meg		63-1926	BTS-2.2Meg	
R24	820K		63-1899	BTS-820	
R25	270K		63-1887	BTB-270K	
R26	2.2Meg 5%		63-1924	BTS-2.2Meg 5%	
R27	1Meg		63-1911	BTB-1Meg	
R28	6.8Meg 5%		63-1949	BTB-6.8Meg 5%	
R29	220K		63-1883	BTB-220K	
R30	5.6Meg		63-1943	BTB-5.6Meg	
R31	680K		63-1904	BTB-680K	
R32	1Meg		63-1918	BTB-1.5Meg	
R33	1000Ω		63-1785	BTS-1000	Note 1
R34	10K		63-3577		
R35	18K		63-3196	BTB-18K	
R36	470Ω		63-1772	BTB-470	
R37	56Ω		63-1723	BTB-56	
R38	330K		63-1873	BTB-330K	
R39	100K		63-1879	BTB-100K	
R40	6800Ω		63-1831	BTS-6800	
R41	470Ω		63-1772	BTB-470	
R42	15Ω		63-1706	BTB-15	Note 2
R43	5400Ω	4	63-3574		
R44	22Ω		63-1740	BTB-22	
R45	4700Ω		63-1813	BTS-4700	
R46	1Meg		63-1911	BTB-1Meg	
R47	33K		63-1841	BTB-33K	
R48	33K		63-1841	BTB-33K	
R49	47K	1	63-1194	BTA-47K	
R50	56Ω		63-1737	BTB-56	
R51	3700Ω	1	63-1575	BTA-3700	
R52	100K		63-1869	BTB-100K	

ITEM No	RATING OHMS	WATT	REPLACEMENT DATA ZENITH PART No.	IRC PART No.	NOTES
R53	100K		63-1869	BTB-100K	
R54	100K		63-1869	BTB-100K	
R55	33K		63-1849	BTB-33K	
R56	680Ω		63-1779	BTB-680	
R57	22K	2	63-1841	BTB-22K	
R58	1.5Meg		63-1915	BTB-1.5Meg	
R59	470Ω		63-1772	BTB-470	
R60	680Ω	1	63-3390	BTA-680	
R61	22K		63-1841	BTB-22K	
R62	220K		63-1884	BTB-220K	
R63	2.2Meg		63-1925	BTB-2.2Meg	
R64	390K		63-1894	BTB-390K	
R65	100K		63-1869	BTB-100K	
R66	68K		63-1863	BTB-68K	
R67	27K		63-1845	BTB-27K	Note 3
R68	390K		63-1894	BTB-390K	Note 4
R69	100K		63-1869	BTB-100K	
R70	47K		63-1855	BTB-47K	
R71	330Ω		63-1756	BTS-220	
R72	2.2Meg		63-1925	BTS-2.2Meg	
R73	1200Ω	1	63-1878	BTA-1200	
R74	68Ω		63-1736	BTB-68	
R75	100K		63-1869	BTB-100K	
R76	560Ω		63-1775	BTB-560	
R77	560Ω		63-1775	BTB-560	
R78	1Meg		63-1911	BTB-1Meg	
R79	1Meg		63-1911	BTB-1Meg	
R80	4700Ω		63-1813	BTB-4700	
R81	180K		63-1880	BTB-180K	
R82	5.6Meg		63-1943	BTS-5.6Meg	
R83	47K	1	63-1065	BTA-47K	
R84	82K		63-1868	BTB-82K	Note 5
R85	560K			BTB-560K	Note 4
R86	180K	1	63-3313	BTA-180K	
R87	1000Ω		63-1788	BTB-1K	
R88	12K		63-1831	BTB-12K	
R89	100Ω		63-1744		
R90	470K		63-1868	BTB-470K	
R91	100Ω		63-1744		
R92	8100Ω	2	63-1261		
R93	47K	2	63-3313	BTB-47K	
R94	3.3Ω	3	63-3769	BW1-3.3	Note 6
R95	8.2Ω	3	63-3568	BW2-8.2	
R96	100K		63-1869	BTB-100K	

Note 1. Some versions use a 47K in this application (part #63-1855).
Note 2. Not used in some versions.
Note 3. Some versions use a 22K in this application (part #63-1841).
Note 4. Some versions use 330K in this application (part #63-1890).
Note 5. Some versions use a 18OK in this application (part #63-1880).
Note 6. Some versions use a 2.2Ω in this application (part #63-3016).

TRANSFORMER (POWER)

ITEM No	RATING PRI	SEC. 1	SEC. 2	SEC. 3	REPLACEMENT DATA ZENITH PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117VAC	510VCT	5VAC	6.3VAC	95-1440				26S33 ①	
	① 1.6A	② .250A	③ 3A	④ 8A						

① Tape 3V ③ 3A winding, tape high HV winding, parallel and phase 6.3V ④ 8A winding, fabricate new mounting brackets.

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No	USE	REPLACEMENT DATA ZENITH PART No.	Halldorson PART No.	Merit PART No.	RCA TYPE No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T3	Horiz. Output Trans.	S-23438 ①							
T3	Vert. Output Trans.	95-1464	Z1800 ② ③	A-3823 ④		V307 ④ ⑤	A-8148 ⑤	26G72 ④ ⑤	A-10EX ④
T4A	Yoke (90°) Horiz. (13MH)	95-1693 ⑥	DF606 ⑦	MDF-91 ⑧	132701 ⑨ ⑩	Y90F12/47 ⑦ ⑧	DY-13A ⑧	Y-14 ⑦ ⑧	Y-40-14 ⑧
B	Vert. (14MH)								

① Complete assembly. Includes: winding and terminal assembly, Zenith part #6-23451, tertiary winding and terminal assembly, Zenith part #6-23446.
② Use 8 to 1 turns ratio.
③ Connect as auto transformer.
④ Drill new mounting hole(s).
⑤ Cut and tape green lead.
⑥ Includes capacitor C12., resistors R76 and R77.
⑦ Connect horizontal damping network across terminals #3 and #7.
⑧ Use original horizontal damping network if necessary.

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	SEC.	REPLACEMENT DATA ZENITH PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T2	10.1K	3-4Ω	95-1438					S-12K	

SPEAKER

ITEM No.	RATINGS SIZE	FIELD	V C IMP	REPLACEMENT DATA ZENITH PART No.	QUAM PART No	RCA TYPE No	NOTES
SP1	10"	PM	3-4Ω	49-713 ①	10A51	33S01	① Used in Models Y2670R2, RU2, Y2670EE, U, Y2670EUZ, EZ
	5 1/4"	PM	3-4Ω	49-751 ②	92A1	21T81	② Used in Models Y2636R2, RUZ, X2636E, RU, X2636R, RU, Y2636EUZ, RZ

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	SEC.	REPLACEMENT DATA ZENITH PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	IF Trap	.1Ω		20-567				
L2	IF Trap	.1Ω		20-567				* Tapped
L3	Ant. Trans.	0Ω		20-563				Channel 13
L4	Ant. Coil	0Ω		20-600				
L5	Ant. Coil	0Ω		20-564				
L6	Fil. Choke	0Ω		20-635				
L7	Neut. Coil	0Ω		20-633				Channel 13
L8	RF Coil	0Ω		20-630				Channel 6
L9	RP Coils	0Ω		20-629				Low bands
L10	RP Coils	0Ω		20-53640				High bands
L11	RP Coils	0Ω		20-571				Channel 13 - Note 1
L13	Osc. Coil	0Ω		20-627				Channel 5 - Note 1
L13	Osc. Coil	0Ω		20-626				Channel 6 - Note 1
L14	Osc. Coil	0Ω		20-625				Channel 5 - Note 1
L15	Osc. Coil	0Ω		20-623				Channel 6 - Note 1
L16	Osc. Coil	0Ω		20-623				Channel 5 - Note 1
L17	Osc. Coil	0Ω		20-624				Channel 5 - Note 1
L18	RF Choke	0Ω		20-636				
L19	Conv. Plate	4.5Ω		S-23758				
L20A	1st. Video IF	.1Ω	.1Ω	S-23226				Part #6-24377 used on tuner #6-24392
B	47.25MC Trap	.1Ω	.1Ω	S-23231				
C	RF Choke	0Ω		20-604				
L21	2nd. Video IF	.1Ω	.1Ω	S-23344			6219	
L22	3rd. Video IF	.1Ω	.3Ω	S-23345				
L23	4th. Video IF	.5Ω	.6Ω	S-23018				Complete assembly #6-23017
L24	Series Peaking Coil	4.4Ω		S-23244		1B-8022	4636	35 Microhenries
L25	Shunt Peaking Coil	1Ω		S-23434				575 Microhenries
L26A	4.5MC Trap	12.5Ω		S-23250				
B	1st. Sound IF	1.5Ω						
L27	Series Peaking Coil	5Ω		S-20880		1B-3135 *	6153 *	127 Microhenries, wound on 1BK resistor
L28	2nd. Sound IF	.3Ω	.6Ω	S-23348				
L29	Quadrature Coil	4.8Ω		S-19020			1480 a	

Note 1. Complete oscillator wafer assembly part #6-23659.
* Parallel with 1BK resistor.
a Drill mounting hole.

TRANSFORMER (HORIZ. OSC.)

ITEM No.	DC RES. PRI.	SEC.	REPLACEMENT DATA ZENITH PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	RCA TYPE No	Ram PART No	Thordarson PART No.	NOTES
L30	105Ω		S-23252		1B-1576	TY-163	6310		19S-5	

FILTER CHOKE

ITEM No.	RATINGS TOTAL DIRECT CURRENT	D. C. RESISTANCE	INDUCTANCE @ CURRENT	REPLACEMENT DATA ZENITH PART No.	Halldorson PART No	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No
L31	250A	66Ω	1000 ^M/A ① 1.7 HY	95-1576		C-3037 ①	C-2996 ①	C-2536 ①	26C44	C-23X

① Drill one new mounting hole.

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA ZENITH PART No. FUSE	HOLDER	LITTELFUSE PART No. FUSE	HOLDER	BUSS PART No. FUSE	HOLDER
M1	3AG B/B	2/10A 125V	136-33		313.200 (3AG B/B 2/10A)	357001	MDL 2/10	4406

ZENITH MODELS X2636E, EU, R, RU, X2670E, EU, R, RU, Y2636EUZ, EZ, RUZ, RZ, Y2670EUZ, EZ, RUZ, RZ (Ch. 17X23)

PARTS LIST AND DESCRIPTIONS (Continued)

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA		NOTES
		ZENITH PART No.	SYLVANIA PART No.	
M2	1N64	103-1	1N60	Video detector (pigtail)

MISCELLANEOUS

ITEM No.	PART NAME	ZENITH PART No.	NOTES
M3	Dial Light	100-166	#PR12
M4	Tuner	S-23212	VHF (12 position) Chassis 17X23, Models Y2636RZ, Y2636EZ, Y2670RZ, Y2670EZ
	Tuner	S-22778	(VHF) Chassis 17X23, Models X2636E, X2636R
	Tuner	S-22779 *	VHF (13 position) Chassis 17X23U, Models X2636EU, X2636RU
	Tuner	S-23213	VHF (13 position) Chassis 17X23U, Models Y2636RUZ, EUZ, Y2670RUZ, EUZ
M5	Tuner	S-22790 *	(UHF) Chassis 17X23U - All Models
M6	Video Detector Assembly	S-23017	Includes M2, L31 and C33
M7	Switch	85-564	AGC (DPDT-Slide Type)
M8	Integrator	87-5	Vertical
M9	Integrator	87-4	Vertical
M10	Centering Device	S-22560	
M11	Width Control	199-193	
M12	Ion Trap	S-17164	Models X2636E, EU, R, RU, Y2636RZ, EZ, RUZ, EUZ, X2670EU, RU
	Ion Trap	S-22574	Models Y2670RZ, EZ, RUZ, EUZ, X2670R, E
	Cabinet	14-1909R	Models X2636R, RU, Y2636RZ, RUZ
	Cabinet	14-1909E	Models X2636E, EU, Y2636EZ, EUZ
	Cabinet	14-1910R	Models Y2670RZ, RUZ, X2670RU
	Cabinet	14-1910E	Models Y2670EZ, EUZ, X2670EU
	Cabinet	14-1906E	Model X2670E
	Cabinet	14-1906R	Model X2670R
	Knob	46-1335 †	On-off-volume Models X2636R, RU, X2670R, RU, Y2636RZ, RUZ, EZ, EUZ
	Knob	46-1337	On-off-volume Models X2636E, EU
	Knob	46-1336	On-off-volume Models X2670E, EU
	Knob	46-1443 ■	On-off-volume Models Y2670RZ, RUZ
	Knob	46-1444 ■	On-off-volume Models Y2670EZ, EUZ
	Knob	46-1368 ▲	Channel selector - Models X2636R, RU, Y2636RZ, RUZ, Y2636EZ, EUZ
	Knob	46-1369	Channel selector - Models X2636E, EU
	Knob	S-22946	Channel selector - Models X2670R, RU
	Knob	S-22976	Channel selector - Models X2670E, EU
	Knob	S-23827 ▲	Channel selector - Models Y2670RZ, RUZ
	Knob	S-23828 ▲	Channel selector - Models Y2670EZ, EUZ
	Knob	S-22863	Fine tuning - All models
	Knob	S-23556 ††	Horiz. hold, vert. hold, brightness, contrast - Models X2636E, R, EU, RU, X2670R, E, RU, EU, Y2670RZ, EZ, RUZ, EUZ
	Knob	S-24217	Horiz. hold, vert. hold, brightness, contrast - Models Y2636RZ, EZ, RUZ, EUZ
	Knob	S-22025	UHF dial indicator - Models X2636EU, RU, X2670RU, EU, Y2636RUZ, EUZ, Y2670RUZ, EUZ
	Safety Glass	192-214	All models

* The combination of VHF tuner (part #S-22779) and UHF tuner (part #S-22790) are replaced under one part #S-22788.
† Alternate part #46-1462 for models Y2636RZ, RUZ, EZ, EUZ
■ Alternate part #46-1462.
▲ Alternate part #46-1478 for models Y2636RZ, RUZ, EZ, EUZ
▲ Alternate part #S-24214.
†† Alternate part #S-24217 for models Y2670RZ, EZ, RUZ, EUZ

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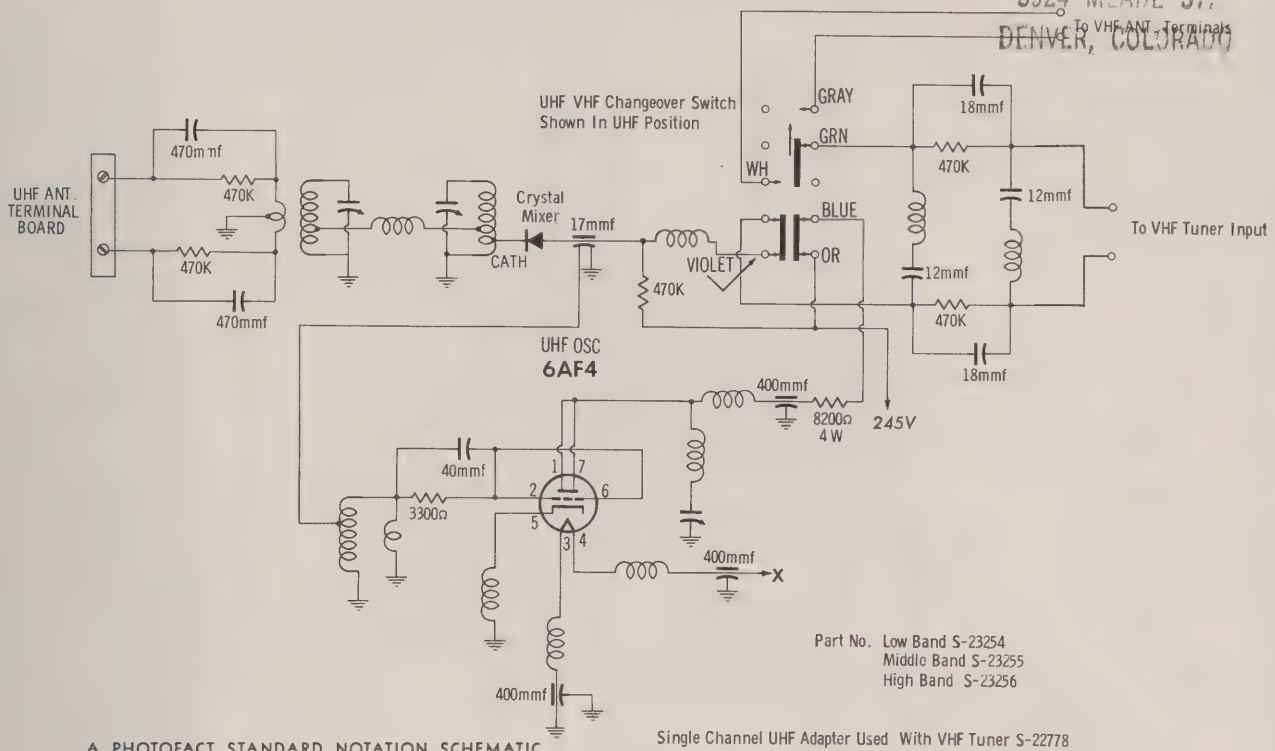
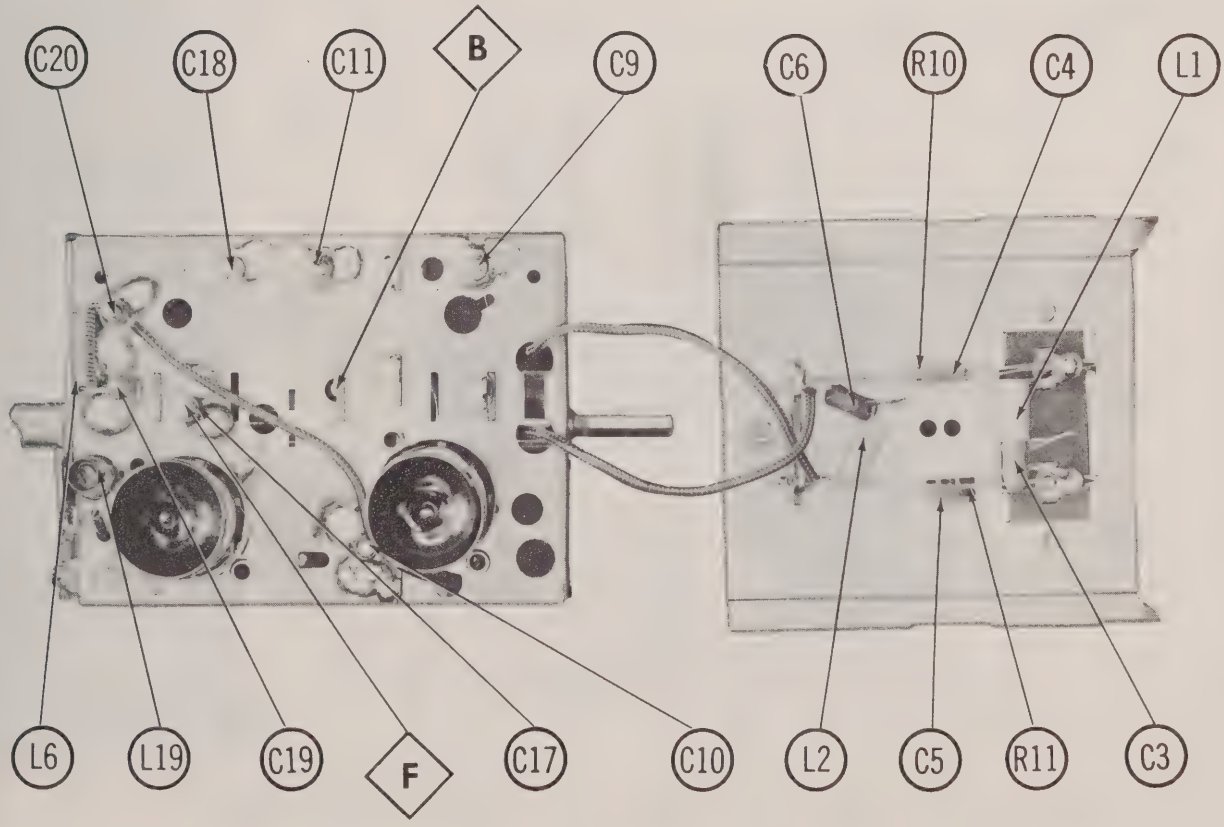
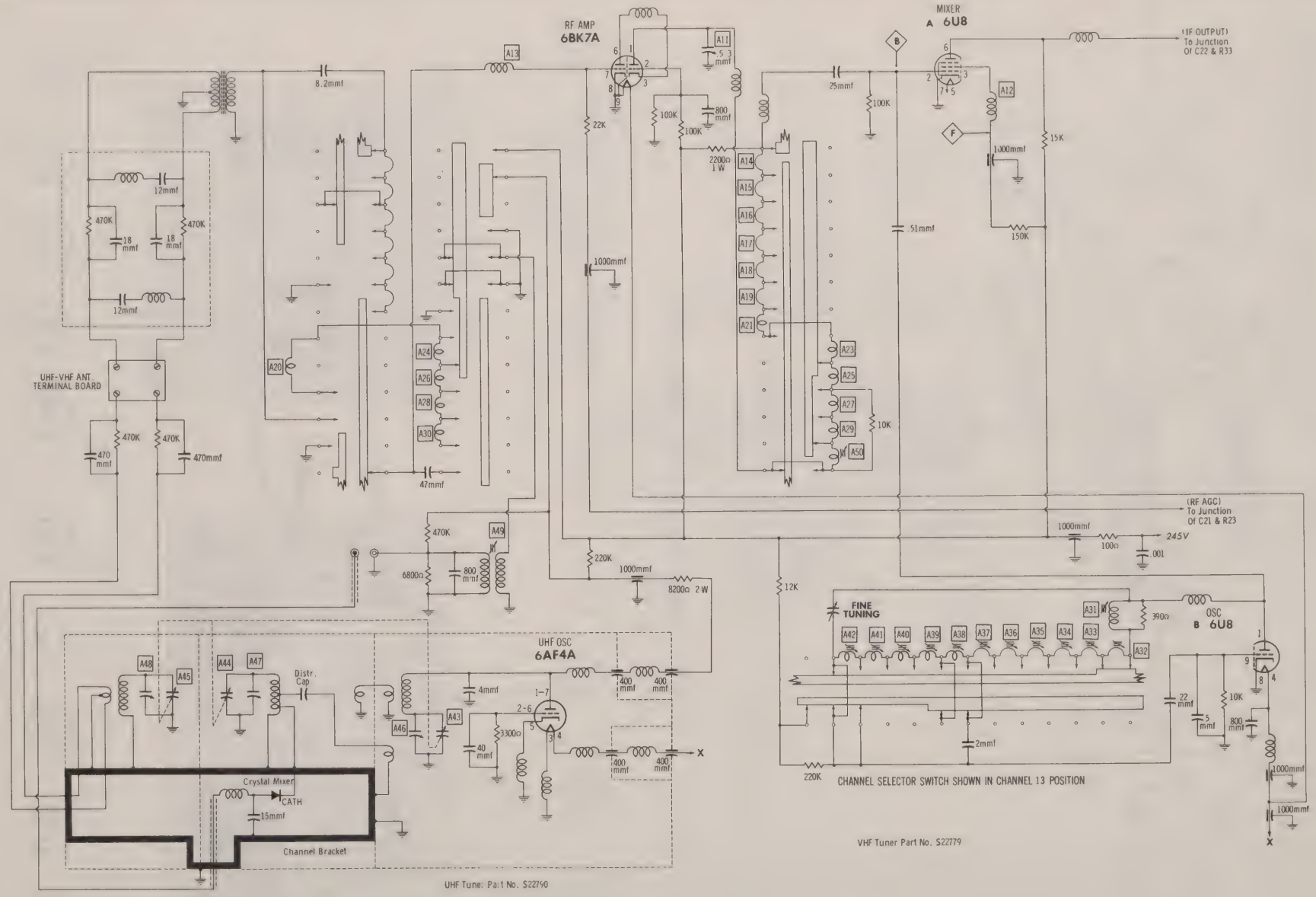


UHF TUNER SCHEMATIC



RF TUNER-TOP VIEW



A PHOTOFACT STANDARD NOTATION SCHEMATIC

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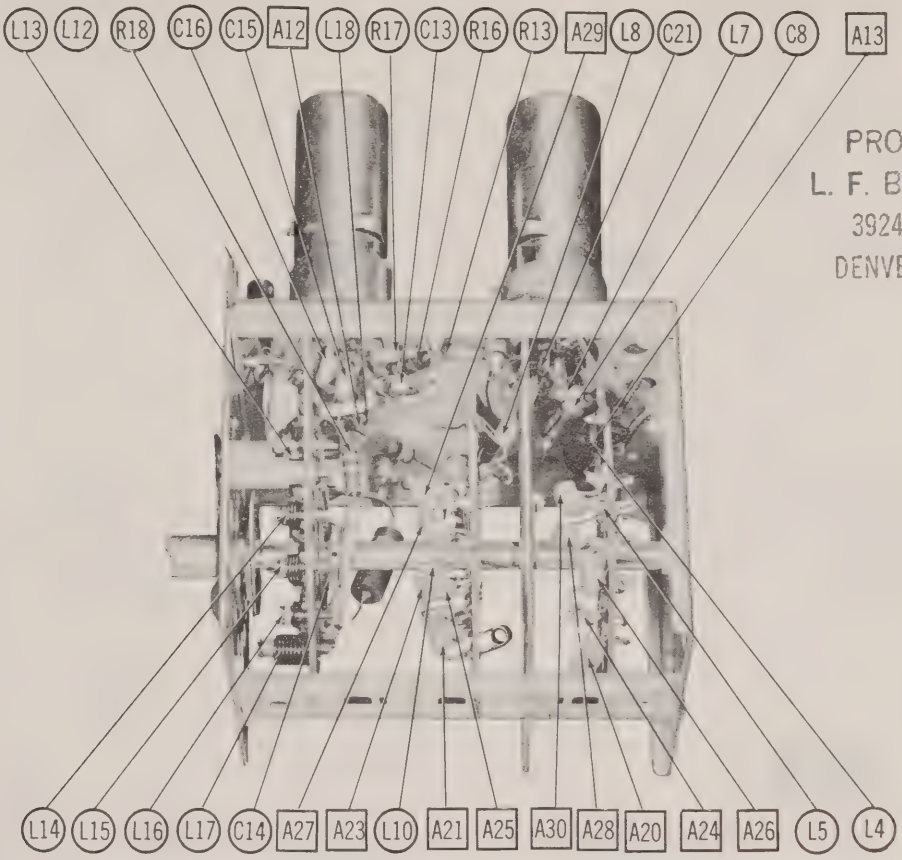
ALTERNATE VHF-UHF TUNER SCHEMATIC



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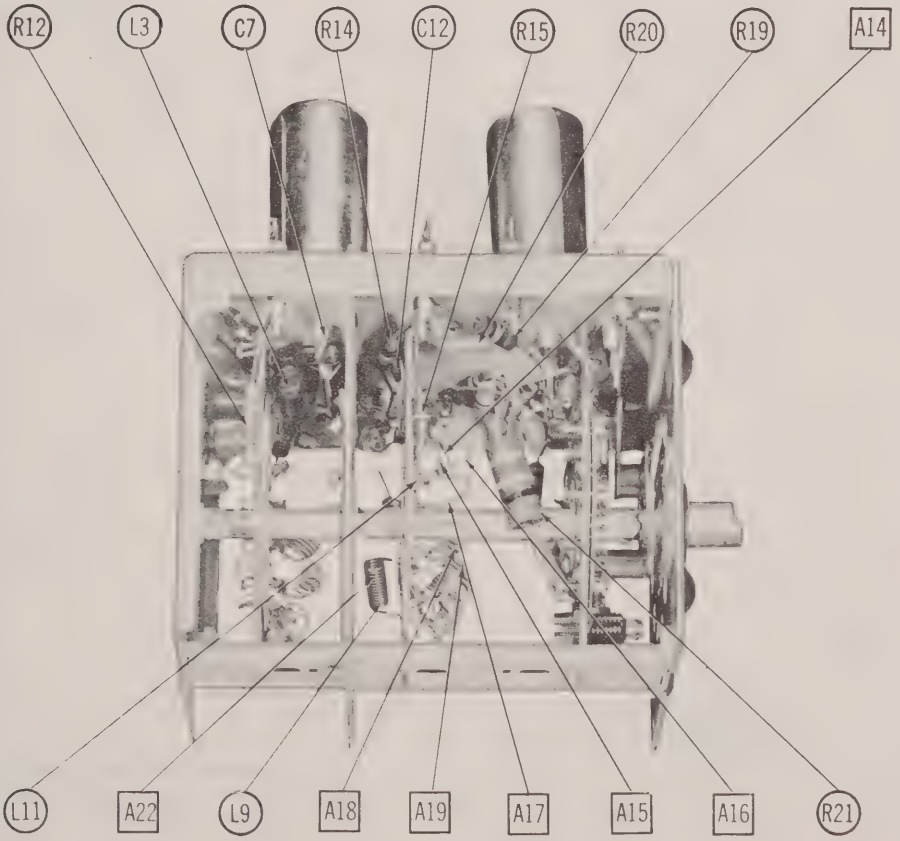
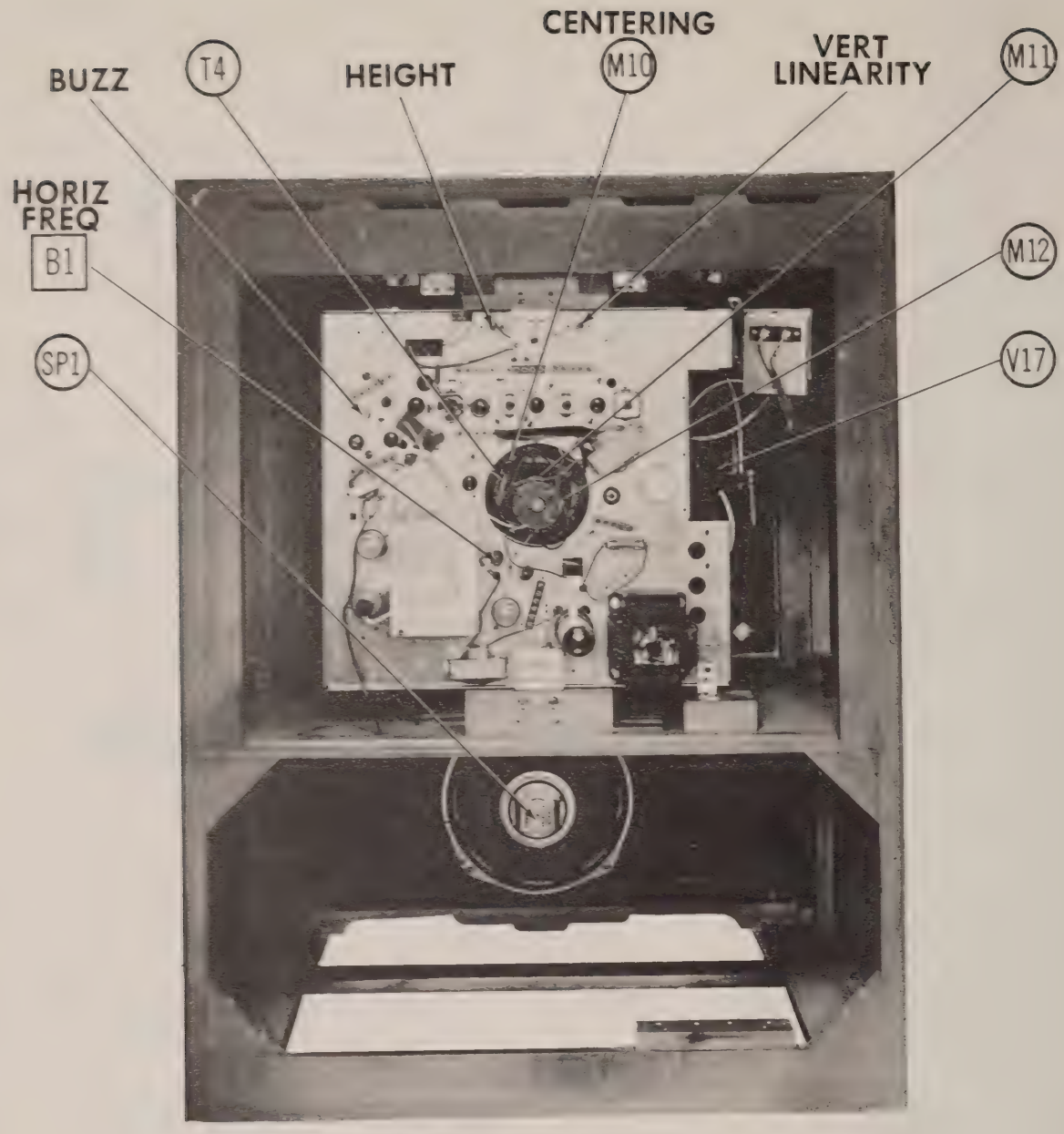
RF TUNER-RIGHT SIDE



RF TUNER-LEFT SIDE



CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

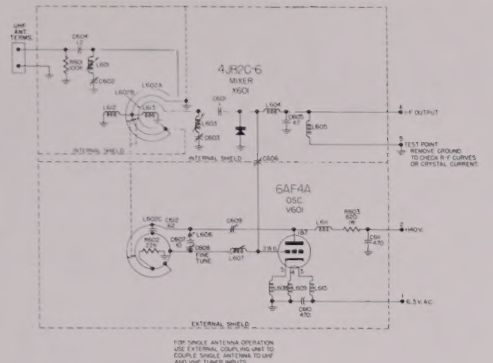
1. Turn the set on and tune in a TV station, preferably with a test pattern.

2. Connect a .5MFD capacitor from point ⊖ to chassis.

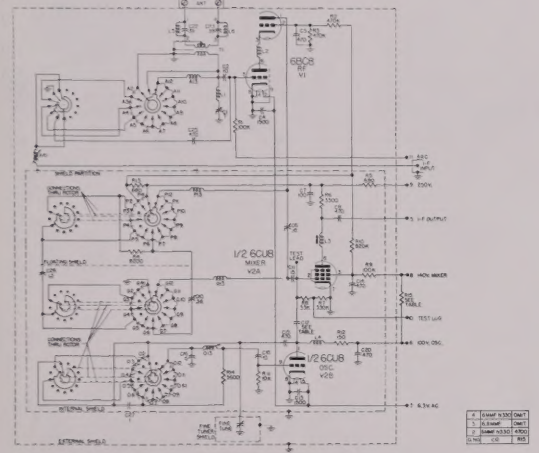
3. Rotate the horizontal hold control until the picture synchronizes horizontally picture may not hold steady.

4. Remove the .5MFD capacitor.

5. Adjust the horizontal frequency slug (B1) until the picture again locks into horizontal sync without readjusting the horizontal hold control.



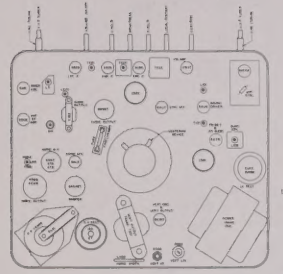
NO. 700530 UHF TUNER

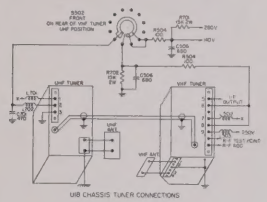


NO. 700541 VHF TUNER

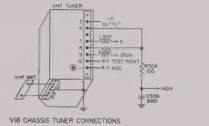
MAGNAVOX CHASSIS
(18 Series)

U18-01AA
U18-02AA
U18-03AA
U18-04AA
V18-01AA
V18-02AA
V18-03AA
V18-04AA

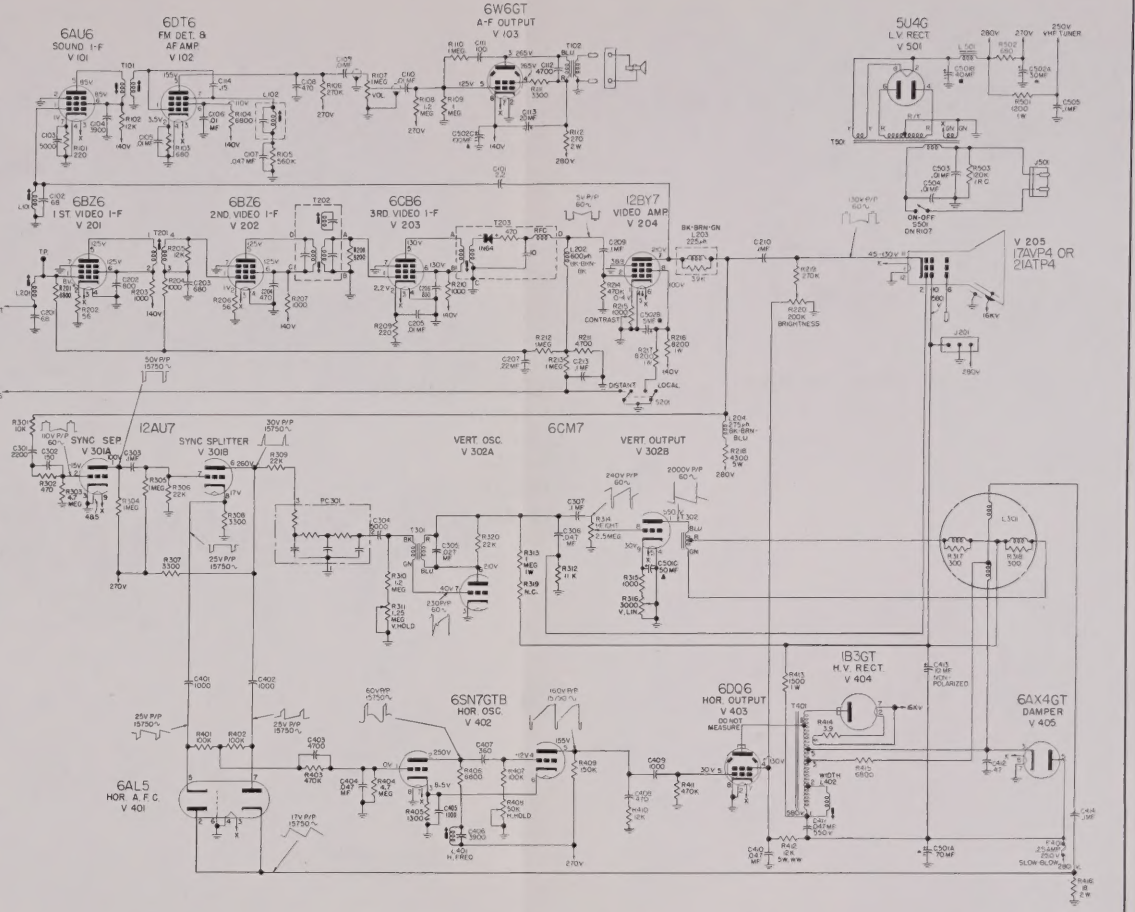




U18 CHASSIS TUNER CONNECTIONS



V18 CHASSIS TUNER CONNECTIONS



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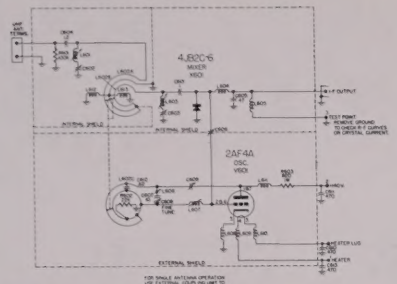
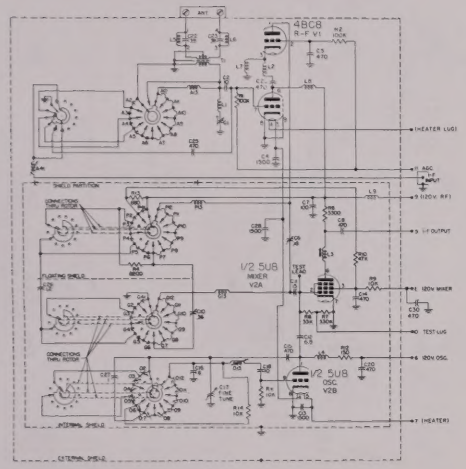
MAGNAVOX

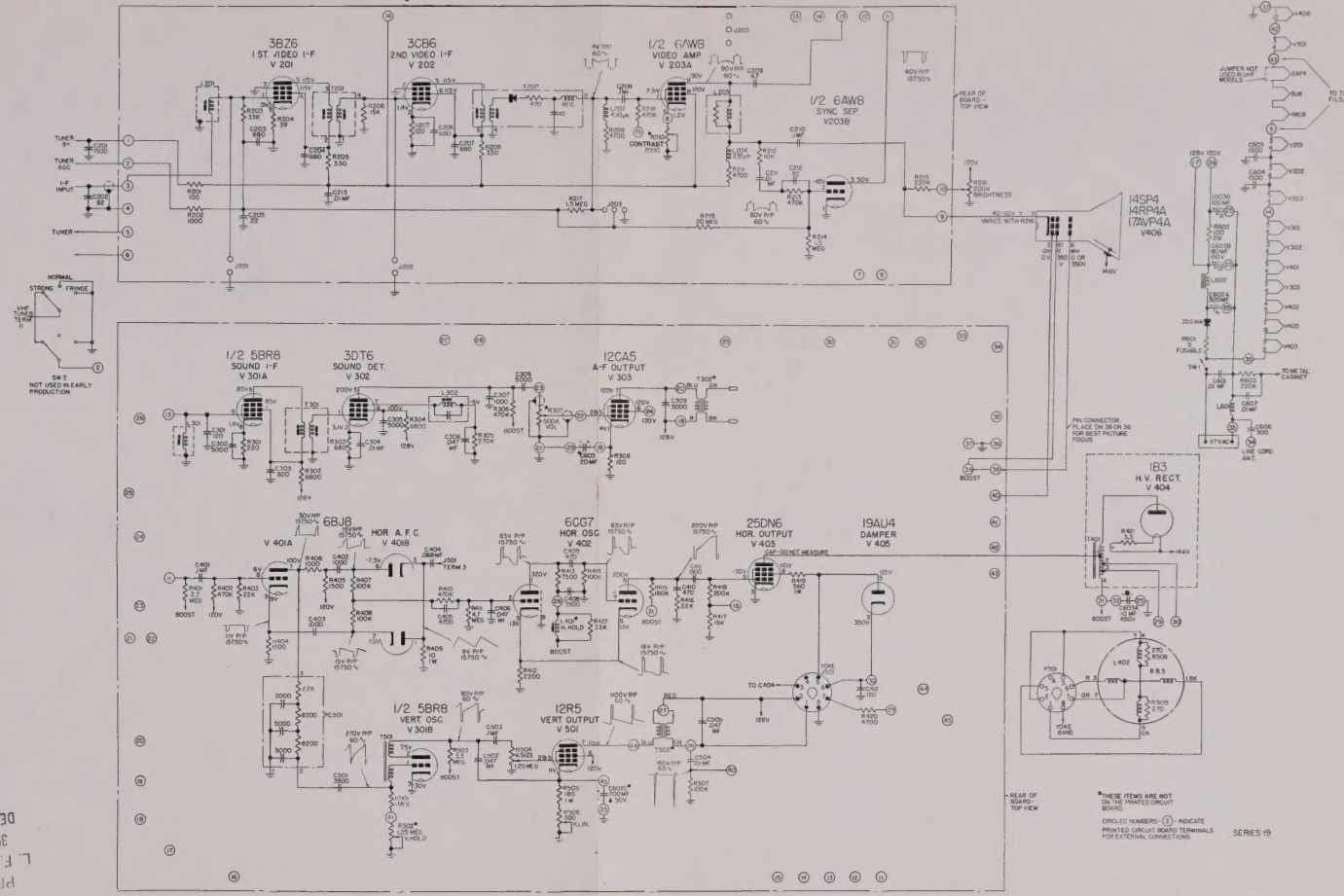


NO. 700556 UHF TUNER



NO. 700555 VHF TUNER

MAGNAVOX CHASSIS
(19 Series)
U19-01AA
U19-02AA
V19-01AA
V19-02AA



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